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QUARTERLY

OF THE

National Fire Protection Association

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40 CENTRAL STREET, BOSTON, MASS.

National Fire Protection Association

INTERNATIONAL.

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West Virginia Inspection Bureau.
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Reports of fires appearing in the Quarterly are copies of or extracts from written reports forwarded to the Association. This Association, as a body, is not responsible for the statements or opinions of any of its members.

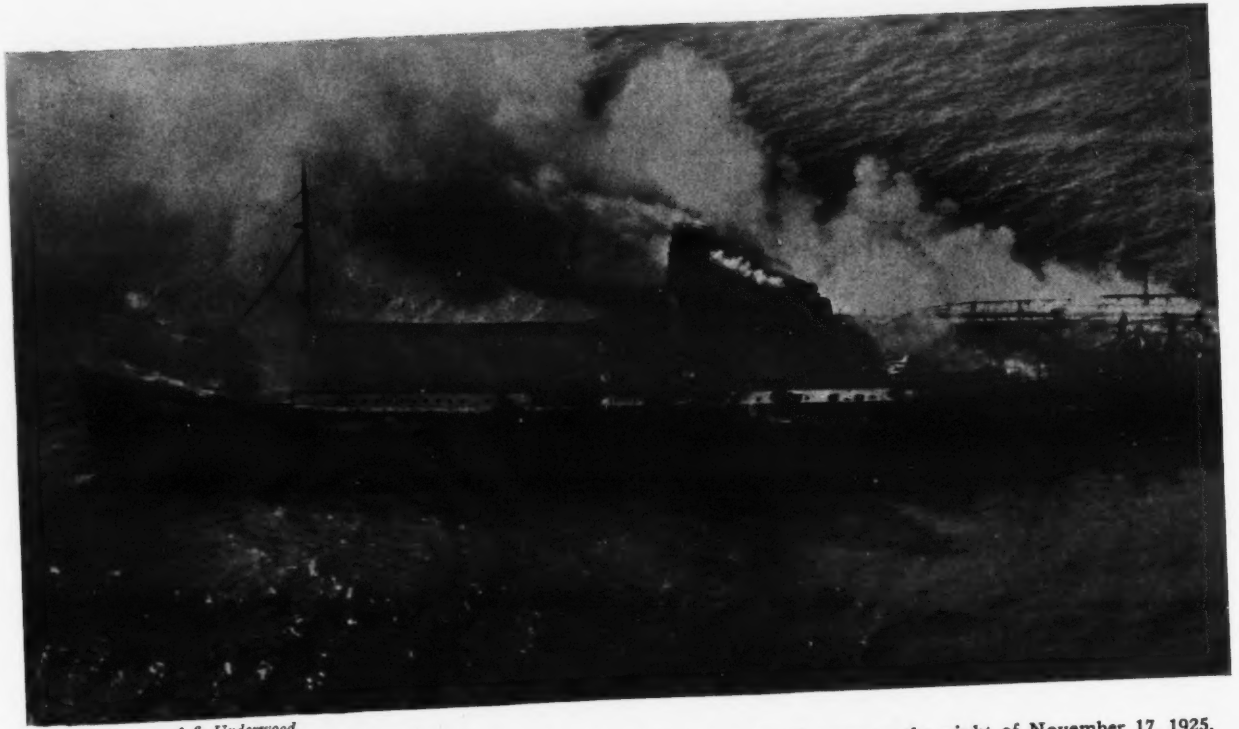

Photo by Underwood & Underwood.

The S.S. Lenape of the Clyde Line was destroyed by fire at Delaware Breakwater on the night of November 17, 1925, with estimated loss of $3,000,000. One life was lost; 367 passengers and crew were rescued with no time to spare. A full report on this fire appears on page 263.

The Quarterly

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The Coming Conflagration. New York City is building for a conflagration, perhaps the greatest in all history. Each day finds new flammable construction added to the conflagration area. Row after row, thousand upon thousand of cheap compact frame shingled roof dwellings have been and are being erected throughout the Borough of Queens.

This development, largely taking place during the past two years, arose from the desire of apartment house tenants to relieve themselves of the excessive rentals which were forced on them. The situation was ideal for the speculative builder and real estate operator who found that there was a ready sale for "homes" no matter how cheaply or quickly built. The large flat undeveloped area of Queens, in New York City but outside of the fire limits, has been opened up with amazing rapidity. The hideous jungle of wooden barracks that has resulted is an expression of all that is sordid and unattractive in our present civilization.

The Board of Standards and Appeals had the foresight to realize what was coming and took the first step to remove one of the worst conditions, namely, the wooden roof shingles. The Board adopted a resolution on December 21, 1923, recommending that the Building Code be amended to prohibit the use of wooden shingles within the city limits. The ordinance was introduced in the Board of Aldermen on May 20, 1924, at which time a public hearing was held, the matter referred to the Committee on Buildings and there it died. This, in spite of the fact that the amendment had the unqualified support of the Superintendents of the Manhattan, Brooklyn, Bronx and Queens Bureaus of Buildings, Fire Chief John Kenlon, Chief Spence of the Bureau of Fire Prevention, The Merchants Association of New York, Building Trades Employees Association, American Institute of Consulting Engineers, the New York Chapter American Institute of Architects, Brooklyn Chapter American Institute of Architects, New York Society of Architects, National Board of Fire Underwriters, New York Board of Fire Underwriters, Queens Borough

report on this fire appears on page 265.

Chamber of Commerce, Brooklyn Chamber of Commerce, the New York Committee, N.F.P.A., and other influential bodies. That the Board of Aldermen of our largest city will remain indifferent to an obvious and ever increasing hazard to the welfare of the citizens of that city is to their disgrace and to the disgrace of American politics.

The State of New York, through the State Housing Commission, has recently taken cognizance of the situation. The Commission held a public hearing on November 13, 1925, and received the opinions of the many authorities on the Queensboro fire menace.

It seems probable that action, either state or municipal, will be taken before many months but the damage has, to a great extent, already been done. The hazard is now an enduring one, constant and menacing.

* * * * *

Store Fires Prevented. Another Christmas shopping season has passed without the department store holocaust long predicted by those who know how many of our densely populated mercantile buildings, filled with highly combustible stock and decorations, fall far below proper standards of construction, protection and exit facilities. There exists no measure for fires prevented, but it may be said without fear of contradiction that the avoidance of serious department store fires has been directly due to measures taken by store managers who realize that on the effectiveness of their fire prevention efforts rest the safety of the public and the continuation of their sales and profits.

* * * * *

"No Smoking" Signs. During the past Christmas shopping season "No Smoking" signs have been widely displayed in mercantile establishments with combustible contents, in an effort to control the serious hazard of promiscuous smoking by customers.

Three distinct types of signs may be observed: "No Smoking, on account of Insurance Requirements," "No Smoking, per order of Fire Department," and "No Smoking, Please. In the interest of safety from fire, we request that customers refrain from smoking in this building." Analyzing the effectiveness of these three types from the viewpoint of the psychology of the customer, it appears that their value is sharply graded in the order named. The first type, where the responsibility is placed on the insurance carrier, gives the impression that the management is not itself interested in fire prevention, but merely posts the sign in accordance with the arbitrary requirement of the insurance company. This does not particularly appeal to the public. The second type, where responsibility is placed on city ordinance or fire department regulation, is more effective. The third class of sign, where the management assumes responsibility,

seems to deserve even more respect for it shows the customer that the management is itself interested in preventing fires, interested in the safety of the visitor while in the building. Properly worded, a warning of this kind cannot offend, and should be by far the most effective of the three. No sign, however, can be depended upon to control completely the smoking hazard; it must always be supplemented by policing on the part of the employees.

* * * * *

"They Satisfy." Many N. F. P. A. members have seen the bill board poster advertising Chesterfield cigarettes, showing a fat gentleman in pajamas reclining in bed puffing on a cigarette, with the caption "They Satisfy." Members have also seen newspaper headlines: "Smokes in Bed; Is Cremated."

Early in December the N. F. P. A. Executive Office wrote the manufacturer of these cigarettes as follows:

> A fire loss of over $25,000,000 annually is charged to the careless smoker. Of the several varieties of carelessness with smoking materials the smoking of cigarettes in bed seems to be about the most pernicious for it most often results in loss of life by fire. We are sure you will appreciate the seriousness and importance of this. We understand that a new poster advertising Chesterfield cigarettes has recently been placed on display throughout the country picturing a man lying in bed reading and smoking a cigarette. This would seem an unnecessary form of advertising. It carries the pernicious suggestion to smoke under the most dangerous conditions from the fire hazard viewpoint. Would it be in order for us to suggest that you discontinue this particular form of advertising?

No reply to this letter has been received.

* * * * *

"Service Club" Activities. The present over-organization that runs rampant in every modern city is becoming ever more of a problem to established community agencies which depend for their functioning upon collective action. Chambers of Commerce in many cities have been drained of their vitality by the so-called "service" clubs which so occupy the thought and absorb the time and energy of business men as to make comprehensive consideration of major issues difficult to secure. The disposition of these clubs is invariably public spirited and in many cities certain of them have headed community enterprises and achieved most creditable results. Built on the lines of mutual exclusiveness, however, it is reasonable that they should function in public affairs only as arms of some non-exclusive general organization such as the local Chamber of Commerce.

This principle has been recognized and adopted in a most interesting and reasonable fashion in Memphis, where the Safety Council became last

September an integral part of the Chamber of Commerce. Speaking before one of the luncheon, or "service" clubs as they like to be called, the new president of the Chamber, Mr. C. Arthur Bruce, said:

> Every day organizations like yours are coming into being only to usurp some of the work of the Chambers of Commerce, gradually pushing the latter organization into the background. You have usurped the social features of the Chamber of Commerce. It is well that you have done this for the Chamber of Commerce is a business organization and not a social club. But you are consuming the attention of the business men we want to put to work and we intend giving such clubs as yours something to do, so that we can get all the business men in Memphis in harness for the city's good. Accordingly we have conceived the idea, originated by Mr. Anderson of our Safety Council, of getting you to co-operate on a particular part of our work. You will in other words have a concrete piece of work assigned to you to father chosen from each of our more important activities. I have talked with your president about this matter and he has felt we are on the right line and has consented that this plan shall be laid before you.

The Memphis service clubs responded favorably and are now actively participating in this co-operative fashion. The plan is proving especially helpful in the work of the safety division of the Chamber. Fire prevention was assigned to the Co-operative Club of which Fire Chief Fitzmorris is a member; and the Kiwanis Club was asked to sponsor the Junior Safety Council, the organization among the school children which furthers instruction in safety of life and limb. The first action of the Kiwanis Club as sponsor was to select in each school one of the keenest members of the Junior Safety Council to serve as the school's fire marshal, reporting regularly upon a blank form as to the condition of exits, etc., in his school. The remaining clubs were assigned sponsorship for other special activities. In this plan of co-operative action Memphis may be showing the way to the solution of the problem of over-organization and duplication of effort which has been increasingly arousing the misgivings of public-spirited men.

* * * * *

The New Orleans Wharf Fire. The largest single fire of the year 1925, as measured by money loss, occurred in New Orleans in November. A complete report is published on another page of this QUARTERLY. Like most such disasters the seriousness of this fire is chargeable to a number of factors, no one of which deserves the entire blame. The watchman was not efficient, the alarm was delayed, and the construction was such as to invite the spread of fire. This disaster furnishes a compelling argument for adherence to the N.F.P.A. Regulations on Piers and Wharves, prepared under the leadership of Member Charles H. Fischer, chairman of the Committee. Particularly striking is the contrast between the conditions found and the committee's recommen-

dations of a maximum distance of 250 feet between fire walls in a wharf of this kind. The fire spread some thirteen hundred feet from its point of origin before reaching a fire wall and might have extended an additional thousand feet in the other direction.

The New Orleans authorities cannot be charged with lack of interest in fire prevention, though the fire does show the inadequacy of the precautionary measures taken. An interesting sidelight is furnished by the following quotation from an address by Commander J. H. Walsh, General Manager of the Board of Commissioners of the Port of New Orleans, delivered before the New Orleans Association of Commerce on October 30, 1925.

> The Board has given a great deal of attention to fire protection during the past few years. As a result the properties of the Board are unquestionably better protected in every way from fire than they ever were before. The new fire tug *Deluge* has now been in use for two years. She is as good a fire boat as exists. We have also constructed a total of nine fire walls at various places on the wharves. These walls have cost the Board a total of, roughly, $200,000. They subdivide the wharves into a larger number of independent fire risks than previously existed. I have no doubt that the number of these fire walls will be increased as the years go by. Indeed, such walls would probably have been built before this but for the uncertainty of the river bank foundations and the lack of funds. We have also greatly increased the facilities for fighting fire with hose and chemicals.
>
> Then, too, in addition to physical protection the Board is protecting itself more fully against fire by insurance and by the establishment of insurance reserves.
>
> The Board has accumulated an insurance fund in cash and securities of, roughly, $1,000,000, and it carries also commercial insurance to the amount of, roughly, $3,150,000 on its wharves. . . . We believe we are already protected to a figure substantially larger than the probable loss from any one fire. However, the loss to the Port from a large fire would be much greater than the actual money loss. Financial loss could be met by commercial insurance and out of our own reserves, but unquestionably a fire on a very large scale would injure the capacity of the Port to serve commerce. And losses of cargo on a large scale would also injure the standing of the Port. The Board has consequently felt it absolutely necessary to minimize the risks by fire walls and other physical arrangements.

* * * * *

Is New England in Danger? Dean Kirtley F. Mather of the Harvard Observatory has been feeling the geologic pulse of New England carefully ever since the earthquake series which she began to experience in September, 1924. He warned her in advance of the shocks felt last October in the Merrimac Valley, and recently he told her that worse upheavals are coming, upheavals as violent as those that visited New England in 1775 and about the same calibre as the Santa Barbara shocks last summer. He predicted that the property damage to New England would be great because of the number of buildings on insecure terrain and the vertical architecture, but he looked for most damage

from panic. He argued the wisdom of instructing the public in "the amenities of conduct during earthquakes." In the light of prior experience, he roughed out a preparedness program:

1. When it comes (any time now, within two or three years) do not rush out in the street, "the most foolish procedure possible" because of falling walls and debris.

2. Install now seismographic stations in many localities, with a view to studying strains on the crust of the earth and perhaps foretelling the exact location of the worst upheaval.

3. Insist on better building regulations and safety measures with regard to gas, oil, electricity and other dangerous commodities.

4. Organize relief units now, along lines indicated by work in California and Japan.

How many New England municipalities will heed these admonitions? In Santa Barbara conflagration was prevented by prompt and courageous action in shutting off gas and electricity, and presumably most public service corporations have provision for similar action in case their employees charged with the responsibility should display the courage exhibited by those in Santa Barbara. As to "better building regulations" we have not so much to hope. Outside of so-called "Class A" buildings it is generally believed there never was an era of such careless and shoddy building construction as now. And even in "Class A" buildings but little thought is given to earthquake possibilities. Our distinguished member John R. Freeman, of Providence, is making a study of earthquakes as they affect modern building safety and has privately declared that by the expenditure of an additional five per cent of the cost of the "Class A" buildings it can be made reasonably resistive to earthquake shock.

* * * * *

Another Christmas Hazard. Several hundred children, in a crowded church, each with a lighted candle, presents evident possibility of fire and panic hazard. At the recent Christmas service of a large church in Winchester, Massachusetts, this hazard in severe form was present. The church was crowded to capacity. The smaller children were put in the rear balcony and for increased seating space the aisles of this balcony were used to accommodate folding individual chairs, making access to stairways difficult. At the close of the service small candles in tissue paper holders were distributed to children and grown-ups and the ushers then proceeded to walk down the aisles with their candles lighting the candle of the persons on the end seats of the pews. These in turn lit the candles of their neighbors, etc. The lights were then turned out and the congregation slowly filed out. It required ten minutes to empty the building. No warnings were voiced or special precautions taken except

that the children were requested to keep their wraps on, and candles were not distributed in the balcony.

It is possible that this kind of service was duplicated in many churches throughout the country. At the time of writing no casualties have been reported from this source. To one who realizes the fearful possibilities this may seem due to a special dispensation of Providence.

* * * * *

Copying America. In a recent issue of *Housing Betterment*, the quarterly of the National Housing Association, we find the following item:

GERMANY COPIES AMERICA.

Recent dispatches from Berlin state that wooden houses, modelled upon American patterns, are beginning to be popular in Berlin. A whole section of wooden houses, a sight hitherto unknown in large German cities, is springing up on the extreme west end of the German metropolis. Heretofore the Germans have ridiculed the idea of wooden houses. Anything that did not last through several generations did not seem worth building to them. But today economic necessity has driven them to study the problem of cheaper construction, and to their surprise they find that the wooden house has stood the test of time in America where there are houses still in existence dating back to Colonial days. They are, therefore, trying out the wooden house which they find much cheaper than the houses built of brick or stone.

America should not be proud to have Germany copy her in this respect. The fire loss figures of the United States and Canada reach their present proportions largely because of the extensive use of wood in building construction. Wood has not stood any "test of time" on its fire record in America, while Germany's older practice of building of brick and stone has been reflected in the good fire record of that country.

* * * * *

Was Nero So Bad? A vaudeville entertainer from Keith's Theatre, who is an expert whistler and imitator of bird songs, gave a demonstration of fire extinguishment by means of high pitched sound waves at the building of the Boston Fire College on Wareham Street, Boston, recently.

A controlled gas flame was placed in a glass tube and extinguished by the drawing of a violin bow over a tuning fork. Then an ordinary gas flame was changed, by the use of a tuning fork of different pitch, into a roaring Bunsen burner. The operator also was able to put out the gas flame in the glass tube by producing a peculiar whistling note with his voice. This note, he explained, vibrated between 14,000 and 19,000 times per second.

As a result of the test a number of cartoons were published in the Boston newspapers showing fires being put out in the future by brass

bands and of the Boston Symphony Orchestra responding to an imaginary third alarm fire with full equipment of horns, drums, and 'cellos. (See cartoon by Collier of the Boston *Herald,* reproduced on page 214.)

But nobody seems to have given a thought to Nero. May it yet appear that the drunken emperor, fiddling as Rome burned, was actually a scientist a number of centuries ahead of his time?

* * * * *

Fire Extinguisher Explosions. Explosions of fire extinguishers, reported in the newspapers from time to time, are apt to have the unfortunate effect of fostering a distrust of extinguishers on the part of the public. As a matter of fact, such accidents are extremely rare, but in order to allay any fears it seems desirable to inquire into the circumstances of such extinguisher explosions as come to our attention. Almost without exception the extinguishers have been of obsolete type which should have been discarded years ago, or have been abused in some fashion.

It is perhaps not generally realized that comparatively high pressures may be generated in the ordinary soda-acid extinguisher. The factors contributing to abnormally high pressures are clogged discharge nozzles, elevated temperature of contents at the time of operation, and charging with too large a quantity of chemicals. Two instances have been reported within the last year or so in which the explosion of extinguishers has been responsible for the death of firemen. One such disaster occurred in Buffalo in August, 1924, when a pressure extinguisher blew up while it was being filled. In this case the assumption is that the pressure gage was defective and that a pressure much higher than that indicated was actually reached during the charging operation. Another case is reported in Leominster, Massachusetts, where a fireman was killed while fighting a brush fire in May, 1924. This extinguisher was reported to be some twenty years old of the six gallon hand-operated, break-bottle soda-acid type. Reports indicate that the bottle was prematurely broken and that pressure was built up before the nozzle was opened. The man who was leaning over the device, attempting to operate it, was killed when the bottom gave way at a joint which apparently had not been properly made.

In view of the instances frequently reported by inspectors where they have found injured extinguisher shells repaired by tinsmiths' soldering, cases where discharge nozzles are plugged and cases where extinguishers are not properly charged, it is perhaps remarkable that so few accidents of this kind occur.

It is reported that the manufacturers of foam type extinguishers have recently reduced the charges because of several explosions with this type

of extinguisher. It appeared that, tested with the solutions at an initial temperature of 120° F., when operated with nozzle closed, an internal pressure somewhat in excess of 350 pounds per square inch was developed. As the test pressure for extinguisher shells is 350 pounds this was not considered safe. This difficulty has now been overcome and the present charges furnished by manufacturers are such that the safe pressure will not be exceeded even with closed nozzle, and the quality and volume of the foam produced have not been affected.

In none of the explosions which have come to our attention has an extinguisher bearing the label of Underwriters' Laboratories and charged in accordance with the manufacturer's directions been involved. It is safe to say that for all practical purposes there is no danger whatsoever of any explosion so long as labeled extinguishers are used and they are recharged and handled in accordance with the manufacturer's directions as given on the extinguisher.

Road Fires.

Burning up the road is no longer confined to hyperbole in its significance. The modest citizen who stays at home Saturday afternoon and rakes the leaves off his lawn and burns them in the roadway is being called to account for setting fire to bituminous and tarred roads. In Connecticut the highway authorities have told the state police to pounce on leaf burners and warn them of punishments to come if they persist in their nefarious practices. So vanish the solaces of life. With old clothes and a pipe, and leaning on a rake to watch leaves burn in the autumn dusk, one could regard equably the deviltries of the speed hound against peace and quiet. Now this is denied, for, say the Connecticut road keepers and truly say, "inasmuch as many roads are treated with asphalt, tar or other substances which contain volatile oil, easily ignited, a serious menace exists." Even though the fires are started in the gutters, it is asserted that the heat from them is sufficient to draw the oils from the bituminous surface of the highway and cause a greatly increased maintenance expense. Reasons so worthy extend true comfort for self-denial and there are possible compensations otherwise — the Connecticut officials say that traveling with leaky gas tanks over smouldering remains of leaf fires frequently causes explosions.

—Editorial from *Engineering News-Record.*

Knott in the Dallas *News*.

HOW IT STARTED

Taylor in the University of Toronto *Goblin*.

FIRE PREVENTION WEEK

"$350,000 DAMAGE BY FIRE IN NEW YORK LAST YEAR THROUGH FAULTY ELECTRICAL EQUIPMENT"- IT'S OUTRAGEOUS!
"PRINCIPAL CAUSES:- OVERSIZE FUSES- MISPLACED WIRING - CHAFED OR WATER DISINTEGRATED INSULATION"
I'VE WARNED TH' WIFE ABOUT LEAVING THAT ELECTRIC IRON CONNECTED!
THE UNNECESSARY FIRE LOSS IS STAGGERING - NOW WHY DID I TIE THIS STRING ON MY FINGER?
A REMINDER TO TURN OFF THE HOT WATER HEATER
CARELESS FOOLS ARE OFFENDERS AGAINST THE COMMON GOOD!
DON'T SHOOT- IT'S FIRE PREVENTION WEEK!
NOW, JUST FOR THAT I WILL!

Johnstone
in the
New York *World*.

PUTTING OUT FIRES BY MUSIC . . . . . *By Collier*

NOW THAT OUR FIRE CHIEF HAS SEEN A DEMONSTRATION OF HOW FIRE CAN BE PUT OUT BY MUSICAL NOTES WE MAY EXPECT MOST ANY TIME TO SEE THE SYMPHONY ORCHESTRA RUSHING TO EXTINGUISH FIRES.
FIRST ALARM
SECOND ALARM
THIRD ALARM.
WHY SHUDDNT THEY PUT OUT FIRES WITH MUSIC, THEY WIN PUT NEIGHBORS OUT WITH IT!
STANDARD FIRE EXTINGUISHER OF THE FUTURE
FOR USE IN CASE OF FIRE ONLY
IF IT'S ALL THE SAME TO YOU CHIEF I'D RATHER YOU LET MY HOUSE BURN
THERE ARE WORSE THINGS THAN FIRES.

Collier
in the
Boston *Herald*.

Fudged Figures.

A report circulated to the press last December by the National Lumber Manufacturers' Association (Member N.F.P.A.) contained the statement that frame buildings have fewer fires than buildings of other types. Carrying the weight of authority of this distinguished organization, editors apparently accepted the news release without question and gave it space in their columns. A detailed analysis of the report is given here showing the errors found.

The report is designated as prepared by the Longacre Engineering and Construction Company of New York, of which one Robert Beck is president. It was this same Robert Beck who made the statement to the effect that fire destruction is good for business, which was commented on editorially in the October QUARTERLY.

For his figures for this report Mr. Beck apparently went to the 1925 Report of the Committee on Statistics and Origin of Fires of the National Board of Fire Underwriters, issued last May. This is the "country-wide survey" which, according to the news release, the Longacre Engineering and Construction Company "has just completed." The figures in this report are for the year 1924. This National Board report shows, for some 84 cities over 20,000 population, the number of buildings of each type of construction and the number of fires in each. The types of buildings are classified under the following headings: Reinforced Concrete, "Fireproof" Steel Frame, Brick and Stone, Iron Clad and Concrete Block. There is also a column for Buildings Not Classified. The number of fires in each of these types of building is given. There is an additional column explicitly labeled, "Other than Building Fires."

Mr. Beck's report is reprinted on the next two pages. He chose to use only 45 of the 84 cities where figures were given by the National Board. While apparently these 45 specific cities were chosen because they had a larger proportion of fires in non-frame structures than the others, this circumstance does not seriously affect the results. The fact that would seem to indicate that Mr. Beck's "engineering" is of similar calibre to his economics is that in making his summary of "Fires in Other Types," meaning fires in buildings other than frame, he not only added together the fires listed under the National Board's classifications of Buildings of Reinforced Concrete, "Fireproof" Steel Frame, Brick and Stone, Iron-

Clad, and Concrete Block Construction, *but he also added in fires in buildings "Not Classified" and fires expressly labeled, "Other than Building Fires"* which include brush, grass, dump, automobile, and like fires. In the summary of figures given at the end of Mr. Beck's report we have added a column in italics to show the number of fires not in buildings at all which are included under the heading in the report as "Fires in Other Types." Corrected accordingly, the figures show that instead of fewer fires in frame structures than in other types, there were in these forty-five cities actually 12,548 fires in frame buildings as compared with 7,680 fires in structures of other types.

The news release circulated by the National Lumber Manufacturers' Association was as follows:

"Frame Buildings Have Fewer Fires."

In forty-five cities of the United States having populations in excess of 20,000 some seventy-five per cent of the buildings are of frame construction, yet there were fewer fires last year in such structures than in those of the other types, according to Robert Beck, President of the Longacre Engineering & Construction Company, which has just completed a country-wide survey of existing conditions.

Commenting upon the report, Mr. Beck says: "Washington, Boston, Fall River, Oklahoma City, Berkeley (California), Topeka, Wilkes-Barre, Salt Lake City, and Milwaukee are among the cities surveyed where there were 851,984 frame buildings out of a total of 1,128,002 of all kinds.

"It was found that although this large number comprising seventy-five per cent of the aggregate were structures of frame construction, only in 1.4% did fires occur, whereas in 6.1% of the buildings of brick, cement and other less combustible materials blazes originated and caused varying damage. Of the combined structures, 2.6% were visited by fire.

"While in most cities the number of frame buildings far exceeds the census of the other types, the opposite conditions prevails in Washington, Salt Lake, and York, Pa. In the first named city, there are 115,932 buildings of brick, stone, etc., for example, and only 30,985 of frame, while in the Utah capitol the figures are respectively 33,050 and 13,350.

"This analysis is, as far as we know, the first of its kind and contains several surprises. It seems to indicate for one thing, that, in spite of popular opinion to the contrary, housewives and others occupying dwellings (which are naturally in the majority among the frame buildings) are more careful in handling fire hazards than are the workers and tenants of factories and other business properties.

"On the other hand, a contributing factor in swelling the non-frame figures may be the 'set' fires involving business enterprises suffering from unsatisfactory trade conditions. One point that stands out clearly is the tremendous dependence upon wood for structural purposes, past and present, despite the trend toward reinforced concrete, brick, stone and other more lasting materials."

Cities	Frame Buildings	Total Structures	Fires in Frame Buildings	Fires in Other Types	*(Fires not in Buildings incorrectly included in the preceding column)*
Berkeley, Cal.	19,865	20,756	514	325	*302*
San Jose	13,400	14,090	136	167	*110*
Colo. Springs	5,000	5,980	110	144	*94*
Bridgeport	20,457	27,548	270	539	*431*
Norwalk	56,514	57,488	113*	131*	*14*
Washington	30,985	115,932	433	2,076	*917*
Waukegan	5,120	5,404	158	129	*75*
Michigan City ...	3,122	4,538	107	149	*72*
Cedar Rapids	13,109	16,373	319	138	*92*
Dubuque	11,668	16,832	175	291	*111*
Topeka	22,222	25,924	333	307	*135*
Portland (Me.) ...	10,685	12,716	425	375	*162*
Boston	80,698	117,285	1,548	2,151	...
Fall River	20,569	24,722	379	368	*283*
Lowell	20,384	22,433	548	689	*561*
Salem	7,533	9,421	71	368	*340*
Battle Creek	12,125	13,512	198	71	*22*
Bay City	19,674	20,795	312	329	*151*
Grand Rapids	49,902	55,407	599	538	*297*
St. Joseph	20,044	28,301	475	667	*444*
Paterson	21,182	25,231	348	332	*179*
Auburn (N. Y.)...	10,092	11,310	74	100	*51*
New Rochelle	10,015	11,628	117	141	*119*
Niagara Falls	9,220	18,419	133	220	*112*
Watertown	9,256	10,352	96	87	*57*
Charlotte	13,793	15,114	321	356	*260*
Greensboro	10,150	11,479	162	92	*46*
Lakewood (Ohio).	11,651	13,033	211	165	*79*
Springfield (Ohio)	11,500	21,000	301	67	*25*
Oklahoma City ...	34,234	37,583	270	780	*679*
Easton	6,415	10,745	67	98	*56*
Wilkes-Barre	16,079	21,161	82	260	*126*
York	4,319	12,773	31	139	*73*
Charleston (S. C.)	11,685	14,649	205	105	*53*
Columbia	8,050	9,404	224	227	*176*
Waco	12,741	14,118	284	150	*124*
Salt Lake	13,350	33,050	203	771	*433*
Portsmouth (Va.).	10,589	11,854	163	139	*98*
Bellingham	13,617	13,936	188	130	*106*
Walla Walla	4,253	4,500	76	48	*7*
Eau Claire	7,632	7,883	185	85*	*60*
Green Bay	6,900	8,162	95	88	*40*
Milwaukee	126,613	146,703	1,165	1,184	*434*
Oshkosh	13,190	14,244	180	75	*47*
Sheboygan	12,382	13,214	104	61	*26*
Totals.....	851,984	1,128,002	12,508*	16,909*	*8,079*

NOTE: Not only is the last column in error because it contains fires not in buildings, but the figures noted by asterisks in the other columns were copied incorrectly from the National Board report. The figures for Norwalk should be 153 and 37 respectively instead of 113 and 131, and the figure for Eau Claire should be 86 instead of 85. The fourth column is also incorrectly totaled. The totals of these columns accordingly become 12,548 and 15,759 respectively instead of 12,508 and 16,909.

The percentages referred to in the second paragraph of this report are obtained as follows: Per cent of fires in frame buildings, dividing the third column,

As the footnote shows, had Mr. Beck used his own figures correctly he would have found that while 1.47% of frame buildings had fires, only 2.85% of non-frame buildings had fires, rather than the 6.1% he claimed. His percentage of buildings visited by fire should be reduced from 2.6% to 1.80%. It may be of interest to note that when the entire 84 cities on which figures are given by the National Board are summarized they show that there were 17,265 fires in 1,070,637 frame buildings, a percentage of 1.61% and 9,436 fires in 336,302 non-frame buildings, a percentage of 2.57%. The former percentage is higher than Mr. Beck's figures, while the latter is lower.

It is difficult to explain how any "engineer" could have expected to have such use of figures go unchallenged, or how a distinguished organization like the National Lumber Manufacturers' Association should have been led into the promulgation of such an absurdity as this report, which, if it proves anything, proves only that fires can occur in all types of buildings. Were it correctly drawn up and interpreted it might be said to prove that nearly twice as many fires occur in frame buildings as in buildings otherwise constructed.

That the ratio of number of fires to number of buildings is about half again greater in brick, stone, steel, and concrete structures than in frame buildings is not surprising as the bulk of frame construction consists of dwellings, generally occupied by not more than one or two families and enjoying a better fire prevention morale than industrial occupancies, while buildings of the better classes of construction tend towards larger size and multiple occupancy with a corresponding multiplicity of opportunities for fire. Another factor to be considered is that many of the fires in brick walled buildings are chargeable to the combustible character of the wooden interior construction.

(Fires in Frame Buildings) by the first column (Number of Frame Buildings): $12,508 \div 851,984 = 1.47\%$. Although 12,508 should be 12,548, this error is negligible.

The percentage of fires in other types of buildings is the fourth column headed "Fires in Other Types" divided by the difference between the first two columns: $16,909 \div 276,018 = 6.12\%$. Here again the numerical error in the fourth column is negligible. However, that fourth column contains, as the column in italics shows, some 8,079 fires which are incorrectly included because they are not fires in buildings. It also contains some 365 fires in unclassified buildings, some of which may be frame construction. These unclassified fires should also have been left out. Similarly in the divisor of this ratio, the difference between the first two columns gives the number of buildings of non-frame construction plus 19,391 buildings not classified as to construction, some of which may be frame.

The correct figures for the list of 45 cities are: number of non-frame buildings, 256,627; number of fires in these buildings, 7,315; per cent of fires in non-frame buildings, 2.85%.—ED.

On Fire Extinguishers.

The editor of *Nauticus,* a journal purporting to cover the marine engineering and insurance field, devoted a page of the November 28, 1925, issue of his publication to a tirade against fire extinguishers. The writer of the article did not hesitate to denounce fire extinguishers as ineffective, useless and dangerous. He said that it was an imposition on ship owners to be required to provide these devices on their vessels.

Mr. S. D. McComb, Chairman of the N.F.P.A. Marine Committee, took it upon himself to remonstrate with the editor, politely informing him that he was mistaken in his opinions and suggesting that he go to Underwriters' Laboratories as an authority for exact data as to the effectiveness and usefulness of fire extinguishers. To his letter Mr. McComb received a curt reply from the editor which intimated that Mr. McComb did not know what he was talking about.

The fire extinguisher manufacturers, too, as represented by Mr. D. S. Hunter, Secretary of the Fire Equipment Manufacturers' Institute (Member N.F.P.A.), protested that the editor's statements were unjust and unwarranted. This brought only the further comment in the editorial columns of the paper to the effect that such protests as the editor had received on his article were obviously biased in favor of the fire fighting appliances.

The original *Nauticus* article was long and rambling. Stated as its writer phrased them, his arguments had an air of plausibility. Bereft of their rhetorical trimmings, the principal contentions of the article were as follows:

1. Chemical fire extinguishers cost a great deal and prove absolute failures when called upon to put out fires. The chief danger of fire extinguishers is their utter uselessness.
2. When fires break out in factories where fire extinguishers are manufactured the manufacturers do not use their own devices, but call the city fire departments.
3. Fire extinguishers are no good because they cannot stop a conflagration nor do they eliminate the need of fire pumps, hose and more elaborate fire apparatus.
4. Trained firemen consider an ordinary seltzer bottle as effective as the most costly fire extinguisher.
5. Fire by itself generates more gas than any fire extinguisher stream can develop, proving that the gas from the extinguisher stream does not help put out the fire.
6. At best extinguishers are as effective as a bucket of water or a shovelful of inert matter.

7. At a test in Europe 19 two-gallon extinguishers failed to put out a fire while a similar fire was put out with one bucket containing five gallons of water.

8. Periodical inspections reveal defects in extinguishers.

9. Tests of fire extinguishers are nothing but a delusion. Such fires are not put out with extinguishers, but are so arranged as to burn themselves out quickly so as to apparently be put out by the extinguishers.

10. Extinguishers are likely to explode and are regarded with distrust.

11. A certain type of extinguisher gives off an objectionable smelling and dangerous gas.

12. No progress has been made in fire extinguishing in 60 years.

13. Fire extinguishers have been condemned by fire chiefs.

No one has explained how statements such as these could be published in good faith in a reputable periodical whose editor had opportunities for obtaining authentic information on the subject. It would serve no useful purpose to devote space to the detailed refutation of such bizarre arguments, but a summary of a few of the comments made by Mr. McComb and Mr. Hunter will be of interest.

In rejoinder to the first point made in the *Nauticus* article, Mr. Hunter admits that fire extinguishers cost money, but to refute the statement that they are useless cites reports of nearly 600 fires extinguished with soda-acid fire extinguishers in the City of Cleveland alone in 1925. These fires occurred in all sorts of buildings: stores, theatres, schools, moving-picture houses, service stations, dry cleaning establishments, laundries, manufacturing plants and office buildings.

The *Nauticus* article emphasizes that fire extinguishers are of no use in conflagrations. Mr. McComb likens the editor's argument to a condemnation of pocket knives because they are less suitable than axes for felling large trees.

Nauticus claims that a bucket of water or a few shovelfuls of inert matter are as effective as any fire extinguisher. Granting this true under certain limited conditions, Mr. McComb suggests that, in most cases, by the time a bucket of water or shovelful of sand was secured, the fire would be of such proportions that a single bucket of water or a single bucket of sand could not extinguish it. Pails of water are a very good thing but could not be very well used on shipboard in living quarters as the water would be slopped about by the rolling of the vessel.

It is true that an ordinary seltzer bottle will prove about as effective as a soda-acid extinguisher, writes Mr. Hunter, who states that the effectiveness is in proportion to the amount of liquid expelled which is in the ratio of about one to ten. Manufacturers of soda-acid extinguishers do not make any particular claims for the extinguishing power of the carbon dioxide liberated by the extinguisher stream. The editor of *Nauticus* evidently knows enough chemistry to figure out that carbon dioxide is a

product of combustion, and reasons that if carbon dioxide can be used in an extinguisher stream to put out fires, it would be logical to expect a fire to put itself out.

The editor apparently knows nothing about the conditions under which extinguishers are made and distributed in this day and generation. He does not seem to know that with few exceptions extinguishers made in the United States and Canada bear the label of Underwriters' Laboratories, certifying to the effectiveness of the device. It is apparent that test fires can be so arranged that they will show up the performance of an extinguisher in a favorable manner. Individuals who sell dry powder tubes and similar unapproved extinguishing devices have been known to extinguish successfully carefully laid out test fires. The tests of Underwriters' Laboratories, however, which each type of extinguisher must pass, are made with no interest in showing the device in its best light: they are rather made with the avowed purpose of discovering defects.

It is true that periodical inspections reveal defects in extinguishers. Periodical inspections of almost anything which requires maintenance will do the same. One of the very reasons for the use of extinguishers rather than pails lies in the difficulty of maintaining the buckets of water and sand which *Nauticus* seems to regard so highly. That fire extinguishers are not regarded with distrust is evident by Mr. Hunter's statement that they have been a commercial proposition for over 30 years. He states further that there are nearly 2,000,000 of the soda-acid type, 5,000,000 of the carbon tetrachloride pump type, and about 500,000 of the foam type extinguishers in use today. This disproves *Nauticus'* statement that extinguishers are not dependable or that they are regarded with distrust, for it is an economic fact that no article which is without value can be sold year after year for 30 years in increased volume no matter what pressure is put behind its sale.

The editor evidently has in mind the carbon tetrachloride pump type of extinguisher when he refers to a type giving off an objectionable smelling and dangerous gas. Carbon tetrachloride is not perfume by any means, but it is effective in putting out certain kinds of fires and unless used in especially confined spaces it is not harmful. Mr. McComb makes the pertinent observation in writing to *Nauticus* that these small extinguishers are about the only kind that can be safely used on live electrical apparatus where the use of water would be dangerous.

That progress has been made in fire extinguishing since 60 years ago is certainly evident by the transition from the manual fire apparatus of that time to the motorized equipments of today. Much more has been done in the way of constructing buildings to make fire extinguishing an

easier matter. This period has seen the development of the automatic sprinkler which is certainly the most dependable of extinguishing devices known at present.

If fire extinguishers have been condemned by fire chiefs, it is a strange state of affairs that the 2½ gallon soda-acid extinguisher is an equipment almost universally carried on the fire chief's own car.

Mr. Hunter suggests that perhaps the only way to impress a person with the low grade of intelligence which the writer of this article must possess would be to put him out in a motor boat without an extinguisher and set the boat on fire. He would then have an opportunity to find out what he could accomplish with a bucket of water or sand.

Be Good If You Can, But If You Can't, Be Careful!

CITY ORDINANCE No. 805

makes it a misdemeanor, punishable by a fine of from $5 to $200 for any person to place, drop or throw a lighted *match* or lighted *cigar* or *cigarette* upon any awning, automobile top or rubbish pile, or to cause *any* fire and destruction of property by carelessly placing, dropping or throwing away any lighted match, cigar or cigarette.

—Billings, Montana, *Bulletin.*

Film Exchange Fire Prevention Results.

The Accomplishments of a Three-Year Campaign by the Motion Picture Producers and Distributors.

Motion picture film exchanges a few years ago were classed as among the most dangerous of occupancies, from the fire hazard viewpoint. Film exchange fires were alarmingly frequent, many of these involving heavy damage and loss of life. Occasionally extensive portions of film districts were laid low. The Pittsburgh film exchange fire of January, 1919, reported in the QUARTERLY for April, 1919 (Vol. 12, No. 4, page 393), where four women and six men were killed, is an outstanding example.

Now, as a result of the fire prevention efforts of the Motion Picture Producers and Distributors of America (Member N.F.P.A.), of which Will H. Hayes is president, the hazards have been controlled, the fires occurring are infrequent and of minor importance. This work has been carried on under the leadership of Mr. Hickman Price, who for three years has been directing the organization's fire prevention activities. According to Mr. Price the first two years were necessarily largely devoted to organization, to convincing the film exchange managers that the fire prevention program was a disinterested, continuing, activity to which they must honestly apply themselves. In the third year, just completed, the results have been demonstrated with the approval of fire preventionists generally and to the gratification of everyone in the motion picture industry. The story of this fire prevention program is given by Mr. Price, who has furnished the data for this article.

Controlling the Hazards of Carelessness.

A motion picture exchange is an establishment from which film is distributed to motion picture theatres. After the picture has been exhibited it is returned to the exchange where it is examined, repaired and stored, awaiting shipment to some other theatre.

There are several hundred exchanges in the United States. Most of them are in the forty largest cities. The bulk of them are branches of large national motion picture distributing organizations. These exchanges supply film to twenty thousand picture theatres which exhibit approximately twenty-five thousand miles of film each day.

The carelessness of employees and the inferior character of the buildings housing film exchanges, the factors mainly responsible for the unfavorable fire record of this occupancy, were attendant on the mush-

This is a model exchange inspection room. Here film is examined for breaks and tears and repaired. Note the cement floor, the sprinkler system, the protected lights, metal tables, protected radiator and the door which opens outward. Most inspection rooms open directly to an alley and nearly every one of them has two doors.

room growth of the industry during the period before Mr. Will H. Hays resigned from the Cabinet and welded the producers and distributors into one great unit.

As part of the amalgamated activities of the producing and distributing companies, Mr. Hays organized the Conservation Division of the industry with Mr. Price at its head. That was three years ago. Since then the fire loss in the several hundred exchanges has been rapidly reduced, until now it is virtually negligible. This has come about through the adoption and constant application of fire prevention measures.

Several thousand employees have acquired a fire prevention consciousness. This keeping of the safety-first idea uppermost in their thoughts has almost entirely eliminated negligence and carelessness, the cause of most fires in any industry.

The use of film is increasing rapidly. During 1926 it is likely that a billion and a quarter feet of new motion picture film will be used. But possible causes of fires are constantly decreasing. This is due to painstaking watchfulness and hearty co-operation all along the line.

A concentrated drive for entirely modern exchange buildings was launched three years ago. About 150 branches have moved into new buildings since then. This is a noteworthy record even in these days of unprecedented building. These buildings are in different cities, but if they were collected in one district they would themselves furnish the nucleus of a fair sized city. The construction of newer and better places to house distributing branches is being carried forward steadily with care and precision. These are built in accordance with the recommendations of the N.F.P.A. Plans are under way now to erect during 1926 new buildings for most of the exchanges in three large distributing centers. With the completion of these an important mile post in the industry's building program will have been passed.

Parallel with the putting up of these buildings has been the erection of many structures not built with hands. These have been built into the thoughts of the industry's workers. These mental edifices have developed with the growth on the part of managers and employees of their understanding of fire prevention.

The workers in the industry have the much to be desired "safety-first" viewpoint and the desire to give constant constructive expression to it. This is attested in many ways not the least of which is the admirable manner in which they co-operate with those who supervise this work. Exchange workers everywhere are doing their level best to maintain high standards of housekeeping.

Field men of the Hays organization visit at reasonably frequent intervals the many centers of film distribution. These men

1. Inspect exchanges in the forty film distributing centers.
2. Instruct branch employees in conservation methods.
3. Supervise practice of exchange fire drills.
4. Instruct Film Board secretaries and Board members in fire prevention practice.
5. Co-operate with fire chiefs and city fire marshals in maintaining safe conditions.

The home offices of the motion picture producers and distributors keep in frequent touch with exchange conditions through reports which are received from the Hays men. These are used as a basis of correspondence with the home office of the producing and distributing companies. This correspondence has as its objective the steady and logical improvement of exchange conditions the country over. It is a basis for constant check-up with the branch managers.

In each large distributing center these managers are organized into film boards of trade. Each film board has a fire prevention committee of three members. Every two weeks this committee inspects the exchanges

This is a typical advertising and poster room where advertising sheets are stored. Note the metal cabinets and the metal tables. This is an exchange where safety is attained through cleanliness.

of all its members. It prepares and sends to Mr. Price's office reports on each exchange. These reports are supplementary to those prepared by the field men. They are likewise used as a basis of maintaining high standards of housekeeping throughout the country, for the Hays organization comments to each film board of trade upon every one of the reports. These reports carefully consider whether film is exposed in any department, strips or scraps of film are in vaults, on floors and tables, vault doors are closed, waste paper and scrap are kept in separate containers, exits are kept clear, fire doors are not blocked, projection booths are clean, wiring and switches are in good condition, lights have vapor-proof globes, radiators and steam pipes are covered, fire extinguishers are provided, sand and water pails are placed in all departments, vault and self-closing scrap cans are used, film is kept in containers in vaults and satisfactory fire drills are held by the inspection committee.

With the branch managers helping each other in this way a fine morale has been built up in these film establishments everywhere. A constant campaign of fire prevention education is carried on. Mr. Price's department prepares and distributes monthly a new illustrated poster message. These are posted in prominent places throughout the exchanges. Their beneficial results are evident. *Fire Alarm,* a monthly publication of the Hays organization, carries the conservation message each month to everyone in the industry.

When motion picture theatres return the reels of film they are received in shipping rooms such as shown here. The shipments are opened on the metal table. The film is placed in metal containers and after it is examined is stored in vaults, the doors of which are seen on the left hand side of this room. Observe the metal rack at the right, the sprinkler system, the protected lights, the fire doors, the "No Smoking" signs, and the fire extinguishers.

There is the finest kind of cordial co-operation between the Hays organization and the N.F.P.A., and organizations such as the Fire Marshals' Association of North America, the International Association of Fire Chiefs, the National Fire Waste Council, the National Safety Council, the National Board of Fire Underwriters, and similar Canadian groups.

In the motion picture industry, safety is rapidly becoming a science. During 1923, 1924 and 1925 the Conservation-Safety-Fire-Prevention policy became pretty well established. In 1926 emphasis is being laid upon the "safety-habit mind." The safety-habit mind stands in contrast to the types of mind found in industries by Lloyd Fisher and described by him as the unguarded mind, the puzzled mind, the stubborn mind, etc. To acquire the "safety-habit mind," means thinking safety. Thinking safety means working safely and working safely means safe conditions generally.

None of the 15,000 persons who lost their lives in fires during 1925 were in motion picture exchanges. Nor were any of the 15,000 persons injured by fire in 1925 employed in these establishments.

Through the efforts of the industry's Conservation Division, lives have been saved, injuries have been prevented and property which otherwise would have been consumed in flames has been maintained in good condition.

With the results of this fire prevention work have come appreciable savings through increased efficiency of employees everywhere. As they have become more observant and careful in saving their companies' property from fire they have acquired the habit of being more thoughtful and thorough in all their activities. The value of savings thus created runs into big figures.

Another benefit of equal importance is the toning up of the morale. Persons who take a wholehearted part in fire prevention, get the habit of thinking and working not alone for themselves but for the common good. This promotes fine team-work and a splendid co-operative spirit, which as everyone knows is essential nowadays to the fullest commercial success.

1925 Fire Loss $373,500,550.

In United States and Canada.

From the New York Journal of Commerce.

Fire losses in the United States and Canada during the year 1925 again reached a disastrous total, nearly equaling the excessive figures of the three preceding years. The aggregate for 1925 as compiled from the daily fire loss records of *The Journal of Commerce* reached the sum of $373,500,550, only four millions below the 1924 total of $377,529,250, but over fifteen and a half million under the 1923 record of $389,192,200. The peak of this Continent's burning ratio, barring conflagration years, was reached in 1922, when the losses reached $410,889,350. Thus the fire loss record of the last four years of the deflation, following the World War, was $1,551,111,350, or an average annual waste of the nation's resources of $387,777,850.

The year just closed has produced a fire loss record that in the main has little to justify its severity. While as at the close of December losses became heavy as a result of a sudden and widespread cold wave, the climatic conditions generally were not unfavorable and there were no serious drought conditions. Fire insurance company executives also find it hard to explain the continued high burning ratio in business and industrial plants as general business conditions have been sound and there was no evidence of undue moral hazard conditions as in preceding years.

At one time about the middle of the year the monthly loss record showed a tendency to decline to normal, but this improvement was not

maintained as will be seen from the following monthly comparison of the past three years:

	1923	1924	1925
January	$36,614,850	$41,243,600	$41,210,400
February	42,774,800	31,447,900	32,472,000
March	41,159,650	28,406,150	33,346,500
April	32,638,150	31,815,900	37,696,800
May	34,015,850	27,832,300	29,170,800
June	34,851,900	20,350,400	23,650,800
July	27,490,750	23,968,860	29,622,000
August	24,474,300	31,349,000	23,348,750
September	28,738,500	29,612,400	25,396,250
October	31,398,450	27,944,400	23,991,250
November	29,702,200	39,081,600	30,320,000
December	25,336,800	44,476,800	43,275,000
Total	$389,192,200	$377,529,250	$373,500,550

$9,246,588,745 Since 1879.

Fire record statistics year by year show an appalling economic waste that only a profligate nation can tolerate. The fire losses of the past forty-seven as compiled from *The Journal of Commerce* records reach the vast sum of $9,246,588,745. The following table of the fire losses since 1879 gives some idea of the extent to which the resources of the country are wasted, mainly due to carelessness:

1925	$373,500,550	1901	164,347,450
1924	377,529,250	1900	163,362,250
1923	389,192,200	1899	136,773,200
1922	410,889,350	1898	119,650,500
1921	332,654,950	1897	110,319,650
1920	330,856,625	1896	115,655,500
1919	269,000,775	1895	129,835,700
1918	317,014,385	1894	128,246,400
1917	267,273,140	1893	156,445,875
1916	231,442,995	1892	151,516,000
1915	182,836,200	1891	143,764,000
1914	235,591,350	1890	108,803,700
1913	224,728,350	1889	123,046,800
1912	225,320,900	1888	110,885,600
1911	234,337,250	1887	120,283,000
1910	234,470,650	1886	104,924,700
1909	203,649,000	1885	102,818,700
1908	238,562,250	1884	110,108,600
1907	215,071,250	1883	110,149,000
1906	459,710,000	1882	84,505,000
1905	175,193,800	1881	81,280,000
1904	252,554,050	1880	74,643,400
1903	156,195,700	1879	77,703,700
1902	149,260,850		
Total, 47 years			$9,246,588,745

The fire loss figures of the *N. Y. Journal of Commerce* are based on estimates of fires involving loss of $10,000 or over, with a percentage added to cover small and unreported losses. These figures are not so accurate as, and are usually about a third smaller than, the statistics computed by the Actuarial Bureau of the National Board of Fire Underwriters which, because of the delays incident to compilation of complete records, are not published until later in the year. (The 1924 losses were given in the July, 1925, QUARTERLY, page 20.) The *Journal of Commerce* figures are immediately available, and valuable for purposes of comparison.—ED.

Large Loss Fires in 1925.

The following list shows twenty-five fires, during the year 1925, where the damage amounted to $1,000,000 or more, according to the estimates of the *Journal of Commerce*.

LOCATION	DESCRIPTION	AMOUNT
Chicago, Ill.	Storage Warehouse	$1,000,000.
Fort Lee, N. J.	Film Laboratory	1,000,000.
Kansas City, Mo.	Pavilion containing Auto Show	2,150,000.
East Liverpool, Ohio	16 Buildings	1,000,000.
Beaumont, Texas	7 Wooden Ships	3,500,000.
Palm Beach, Fla.	2 Hotels and other buildings	1,750,000.
Chicago, Ill.	2 Grain Elevators	2,250,000.
Newark, N. J.	Wire Nail Manufacturing Plant	1,000,000.
St. Joseph D'Alma, P. Q.	23 Stores, Residences, etc.	1,000,000.
Groveland, Fla.	Lumber Mills, 4 dwellings	1,000,000.
Hammond, Ind.	Lumber Plant, Brass Works	2,000,000.
Camp Mabry, Texas	Army Property	1,000,000.
San Francisco, Calif.	4 Packing Houses	1,000,000.
Manila, P. I.	Cocoanut Oil Plant	1,000,000.
Macon, Ga.	Lumber Yard	1,000,000.
Hawkesbury, Ont.	Lumber Plant	3,000,000.
North Side, Pa.	Warehouse	2,000,000.
Seattle, Wash.	Automobile Salesrooms and Garages	2,000,000.
Corinth, Miss.	Compress Plant	1,000,000.
New Orleans, La.	Docks, etc.	4,000,000.
Lake Charles, La.	Telephone Exchange and other	1,000,000.
Council Bluffs, Ia.	Business District	1,000,000.
Savannah, Ga.	Fertilizer Plant	1,000,000.
Baltimore, Md.	Grain Warehouse	1,000,000.
South Boston, Va.	2 Business Blocks	1,500,000.

Canadian Losses Lower in 1925.

Fire losses in Canada in 1925 are estimated by the *Monetary Times* at $30,560,090, the lowest since 1921. The loss in 1922 was $48,746,000, in 1923 $34,619,250, and in 1924 $33,319,609. These estimates include all reported fires and $6,000,000 annually for unreported fires. By provinces, compared with 1924, the reported losses are:

	1924	1925
Alberta	$1,695,996	$901,700
British Columbia	2,216,700	2,808,000
Manitoba	1,958,050	1,206,500
New Brunswick	926,600	1,584,000
Nova Scotia	1,609,200	1,415,000
Ontario	9,875,263	9,463,308
Prince Edward Island	80,000	10,000
Quebec	7,084,900	5,084,282
Saskatchewan	1,862,900	2,107,300
Total	$27,319,609	$24,580,090
Estimated unreported fires	6,000,000	6,000,000
Total estimated loss	$33,319,609	$30,580,090

Fire Prevention Legislation.

By Geo. W. Booth (Member N.F.P.A.).
Chief Engineer, National Board of Fire Underwriters.

The urgent importance of well designed fire prevention measures is illustrated by the steadily mounting annual fire loss. In the larger cities of the country there has slowly developed the conviction that protection facilities in the shape of powerful fire departments is not the entire answer, and that fire loss reduction can only be attained by attacking the problem at its source. In the smaller cities this realization has been slower in development and efforts along fire prevention lines have met with considerable opposition. The general tendency of municipal authorities has been to view these efforts as idealistic, or as a means of bargaining for lower insurance taxes. During the past year, however, there have been numerous encouraging signs of change in this attitude as evidenced by numerous calls for help in the preparation of fire prevention ordinances.

The common hazards are the principal fire causes. Their safeguarding can be accomplished through proper enforcement of ordinances or state laws covering building construction, storage, handling and use of explosives and flammables, electrical installations, dry cleaning establishments, garages, storage, handling and use of nitro-cellulose film, storage of trash and rubbish, and storage, handling and use of matches. Of course, most cities have special hazards in the shape of manufacturing plants involving hazardous processes, but these can be regulated by special requirements drawn after careful study.

Most cities have ordinances, or state laws dealing with at least some of these subjects, but in the majority of cases they are incomplete or obsolete, and in numerous instances enforcement is poor. What is needed is codification of these regulations with necessary amendments to make them comprehensive and with enforcement in the hands of a capable and aggressive official. One of the chief values of a fire prevention code is the ease and convenience of reference. Our engineers have frequently encountered cases where a city official deplored his inability to remedy some particular condition and subsequent digest of the various state and municipal laws disclosed a measure giving him the necessary power. Important legislation should not be hidden away in a volume containing other laws, but should be arranged for ready reference.

From a paper read before the National Fire Waste Council, Washington, September 22, 1925.

If an ordinance or law is to be of any value it should be sufficiently in detail to properly cover the subject and leave nothing so obscure as to invite misunderstanding. The need of this detail, however, has proved a stumbling block in most of the smaller cities, as the authorities as a general rule are not willing to spend any material amount of money for printing. Such expenditure is of course necessary as the laws in most states require the publication of ordinances before action is taken. In at least one city this difficulty has been overcome by printing and adopting the important provisions and including the others in a code of practice. This code of practice is filed in the office of the official charged with enforcement and is used by him as a guide in securing safe conditions. In some cities the desired results are obtained by adopting measures by title, but in most cases city charters require all provisions no matter how detailed to be read into the ordinance. Every effort should be made to secure adoption in such a way as to preclude any question of validity.

As so many ordinances and laws through improper presentation have failed of adoption and considerable time and labor brought to naught, it probably will not be amiss to say something on the general procedure of drawing and securing legislation. There is usually a man or a group in a city council or state legislature prone to consider the subject of fire prevention as idealistic and impracticable. Much of this opposition will be overcome and considerable time and labor saved if the proposed legislation is based on measures already in successful operation elsewhere and which have been prepared through the co-operation of all interested parties. Suggested ordinances and regulations of the National Board of Fire Underwriters and the N.F.P.A. have this important advantage.

When the law or ordinance has been drawn, the matter of having it introduced should be entrusted to a man possessed of aggression and capable of forceful and effective presentation. Every effort should be made to anticipate possible opposition and provisions made to meet it. Previous to introduction, endorsement of the local chamber of commerce, Rotary and Kiwanis Clubs, local safety council, state fire chiefs' association and other influential civic bodies should be secured. Such endorsement will go a long way in convincing doubtful council or legislative members and to a great extent counteract opposition from affected interests.

When all is said, there remains the important subject of enforcement. A poorly enforced measure is little better than none at all. The man so charged should know his business and be thoroughly conversant with all provisions of the ordinances or code. A well thought out measure will require no apologies or excuses when enforced and hence should cause no doubts or embarrassment to occur, so far as the enforcing officer is concerned.

Bureau of Standards' Fire Test Activities.

The activities of the Fire Resistance Section of the U. S. Bureau of Standards are many and varied. The following summary, extracted from the annual report of Mr. S. H. Ingberg (Member N.F.P.A.), who is in charge of this work, is of interest from a number of angles in connection with the technical committee work of the N.F.P.A. While some of the test work being conducted at the Bureau is familiar to QUARTERLY readers, there are other features upon which no reports have as yet been published. In many cases it is impossible in advance of completion of test programs to announce any definite results or conclusions and the mention of the items covered is only to give data as to the general character of the tests in progress. In other cases where work is more nearly completed it is possible to refer to published reports.

Fire Resistive Properties of Materials.

Tests on fire resistive properties of various building materials are now in progress or have been recently completed. A series of tests of brick walls under load, giving results that show the fire resistance that may be expected of several types of walls under varying conditions, have been completed. A resumé of these tests was published in the QUARTERLY for January, 1924 (Vol. 17, No. 3, page 243).

Another series of tests along somewhat similar lines is now in progress for hollow tile walls, this being carried on in co-operation with the Hollow Building Tile Association. This investigation is concerned mainly with load-bearing tile from 8 to 16 inches in thickness.

A series of comprehensive tests on concrete columns has been completed and the results are published in Technical Paper No. 272.

Fire tests of roofing materials are being made for the purpose of determining the susceptibility to ignition by brands and flame of wood shingles and composition roofing and the relative fire and conflagration hazards involved. This program includes not only tests on small roof decks with regulated wind velocity and ignition by varying sized brands, but also a series of tests with air currents at elevated temperatures reaching as high as 150° C. (302° F.) in order to give results typical of conditions surrounding burning buildings or areas in conflagrations. A decidedly greater susceptibility to brands was found with air currents at 150° C. than at ordinary temperatures. It is further proposed to obtain

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Test fire at the U. S. Bureau of Standards. Building with contents representing record room occupancy being burned out to determine the temperatures reached and the duration of the fire. (See illustration page 236.)

roofing for test that has been in service on buildings for ten years or more. No general results or conclusions can be given at this time, pending completion of other portions of the investigation.

A series of comprehensive tests on theatre curtains has been made to determine the fire resistance and general effectiveness of theatre proscenium curtain construction. An article summarizing these tests was published in the April, 1925, QUARTERLY (Vol. 18, No. 4, page 366).

The fire tests of safes and other record protection devices were continued during the year. These tests are primarily made for departments of the United States government. Tests for manufacturers are generally not made unless essential information on the general problems involved in the construction of record protection devices can thereby be obtained.

Intensity and Duration of Fires.

The object of the investigation on the intensity and duration of fire is to provide a basis for applying the results of fire tests. These are stated in terms of performance under certain controlled fire conditions and information is needed on how these standard test fires compare with the

Interior of the test fire building filled with old books and papers to represent a typical record room occupancy. This was burned out to determine the temperatures reached and the duration of the fire. (See illustration page 235.)

intensity and duration of fires that can occur in actual buildings of given occupancy and construction. It has proven impractical to secure any satisfactory data of this kind from actual fires, which fact indicates the importance of this test fire program. A one-story brick and concrete building about 16x30 feet has been erected. This was filled with discarded furniture to represent office occupancy. A fire was started in a wastebasket in the first fire test and in a larger amount of combustible material in two other tests. The temperatures were measured at representative points throughout the room, readings being continued until the interior cooled down. No attempt was made to extinguish these fires; they were allowed to burn themselves out. In a subsequent test the same building was furnished with wooden shelving on which were placed obsolete records, the total weight of combustible contents being 58 pounds per square foot of floor area, which is considered representative of congested record room occupancy. Considerably higher temperatures and much longer duration obtained in this test than in the previous test representing office occupancy where the combustible contents were only one-fourth as great. These tests have not as yet progressed sufficiently far to warrant publication of any conclusions beyond those contained in the

1924 report of the N.F.P.A. Committee on Protection of Records (Proceedings, 1924, pages 463 and 464). In order to make these tests clearly representative it was necessary to have fires in a larger structure as the size of the undivided area under fire may have an important effect on the intensity and duration. Accordingly a larger building, measuring 30x60 feet in inside dimensions, is being constructed which it is proposed to furnish with contents typical of office and other occupancies and to burn out as in the case of the smaller building.

Strength of Materials at High Temperatures.

Tests are in progress on the compressive strength of rolled steel and cast iron shapes at temperatures up to 900° C. (1632° F.). The object of this investigation is to secure information of interest from the standpoint of fire resistance on the strength and deformation of structural building members under load at elevated temperatures.

City Inspections.

By Eugene Arms.

Mutual Fire Prevention Bureau (Member N.F.P.A.).

It is not so difficult to create an abstract desire to prevent fire as it is to convince an individual that his own property is in danger. That we all look for the mote and disregard the beam is as true now as it was two thousand years ago. It is a human trait that we cannot hope to change.

It is well to teach a man what it were good to do but it is better to show him. The direct method is most productive of results both immediate and deferred. Few men know or realize the fire hazards existing even in their own homes, and nearly all will welcome the assistance of someone qualified in the work, either at home or at their place of business. The spirit of community pride and co-operation and the determination to prevent fires must be developed through all the means of publicity obtainable, but having developed that spirit the desired results will not be attained until the public is shown what to do and how to do it. It is not enough to show this by demonstration. The individual must be shown the fire hazards existing in his own property.

There are many methods of organizing and carrying out systematic city inspections. The most common is by regular inspection departments within the fire department, each section of the department having responsibility for its own fire district. Good fire fighters are not always good inspectors. This phase of the work should be under the direct super-

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From a paper read before the National Fire Waste Council, Washington, September 22, 1925.

vision of a fire prevention engineer well qualified to instruct and assist the members of the department.

Most gratifying and satisfactory results have been accomplished by city inspections, planned, supervised and carried out by the Chamber of Commerce and other civic organizations with which it is associated such as the Rotary, Kiwanis, Lions' or other luncheon clubs and the Woman's Club.

These city inspections should never be attempted without very carefully preparing the public for them. An advertising campaign must be begun well in advance of the day or days of inspection. No opportunity to awaken civic pride may be overlooked. A very large part of the volume of a city inspection results from the clean-up made in preparation for the inspection. Also as a means of arousing public interest the largest practicable number of people should be used on the work. Through the use of the Boy and Girl Scouts and all of the school children, some direct contact may be made with nearly every home and place of business. The Scouts may be used for the house to house distribution of fire prevention bulletins and those qualified may work in groups on the inspections under the direction of a competent leader. The school children, after careful instruction, may be supplied with home inspection blanks and required to fill them out, turn them in to the person in charge at the school, and then report again when the unsafe conditions have been made safe. Awards of merit may be provided for the best reports and the best work.

The inspection of the mercantile and industrial plants must be carried on by men with knowledge and experience in fire prevention. There must be one head to the organization with such assistant directors as are needed. The city should be divided into sections and direct supervision of each section assigned to one of the assistants. Under the assistants should be the inspectors. Two inspectors usually work together. One team should not be assigned more work than it can do well, and no opportunity should be lost to interest the owner in the care and maintenance of his property. The good will of the property owner is worth everything. Results accomplished under compulsion are seldom lasting. Pressure should not be brought to bear except in the most extreme cases and then only by the fire marshal's department or the city official having authority.

In many states the fire marshal's department is so organized that its services are invaluable in the organization and direction of a city inspection. In other states the assistance of the fire prevention engineering departments maintained by the insurance rating and inspection departments may usually be obtained.

Competent supervision, both in the preparatory publicity campaign and in the direction of the inspections, is the one indispensable feature of

the work. Inspections intelligently made in a spirit of co-operation and helpfulness, really get results in reduced fire losses that can be accomplished by no other means.

Adventures in Standardization.

By H. B. Clark, Secretary, The Hartford *Courant*.

(Member N. F. P. A.)

This article describes interesting features of the work of standardizing hose and coupling threads in various communities in the State of Connecticut. Similar "adventures" would likely be the lot of anyone connected with similar work in other parts of the country. The author is acting as a sort of reporter, telling about this work as he has observed it in his state while assisting, in a volunteer way, the engineers of the New England Insurance Exchange (Member N.F.P.A.), who are pushing standardization in the New England States.

Old Test Methods Not Reliable.

One of the things which this work earliest demonstrated was the fact that the ordinary methods of testing threads by caliper and thread gage or by the paper strip method are not reliable.

To amplify this statement a little, measurement by caliper and by thread gage, held to be particularly reliable when made by skilled inspectors, was proven subject to error twice in as many days right before the eyes of a careful and trained inspector who did the work himself. The two instances also proved the unreliability of the paper strip method which is more generally used, under the same conditions. Only the application of the test gage brought to light non-standard conditions which both other methods of testing would have passed as satisfactory.

Caliper measurement of a mill hydrant outlet showed the standard 3 1/16" diameter, and thread gage measurement showed the standard 7½ threads to the inch. The inspector was about to congratulate the superintendent when, just as a matter of form, he applied the standard test coupling. It would not go on. Further investigation indicated that the threads were not cut at the proper angle or to the proper depth. Male hose ends showed a trifle over-size. This equipment would have been recorded as standard, if measurements had been taken by the paper strip method, just as certainly as it passed the tests of caliper and thread gage. Only the application of the test coupling brought the real condition to light and caused the plant to be listed as needing standardizing.

A somewhat similar condition developed at another place. At the fire station, operated by a mill, the hose was close to standard and the first

two hydrants showed the same. At a third the caliper measurement showed slightly under standard diameter, the thread gage checked the number of threads at 7½, but the test coupling would not go on. The inspector went through it all over again; the result was the same; everything passed the instrument test, but the coupling would not make up. A second outlet showed precisely the same situation. The inspector then began experimenting with the caliper, trying it vertically and at various angles instead of simply horizontally, as in ordinary practice, and the puzzle was solved. The nipples, which had been screwed into place, had been set up so tightly as to have been sprung into an elliptical shape, so far out of round as to be over-standard in diameter in one direction while under-standard in another.

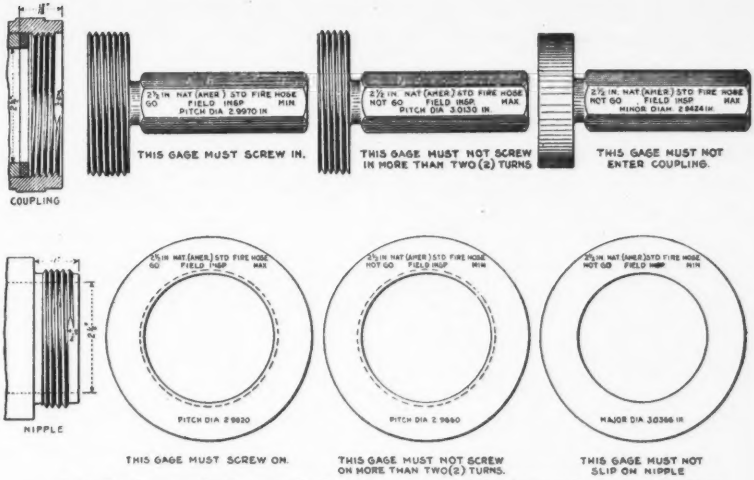
By the paper strip method of measurement this condition would likewise not have been made apparent. The master mechanic in charge declared that the hydrant had been used in practice and no complaint had been made by the hosemen of difficulty in making a connection. The plant was listed for standardizing, with the advice that cases like the one found be treated by expansion of the nipple over-size sufficiently to reach a true circle and then cut down to standard diameter with correct thread.

Nothing Can Be Taken for Granted.

Statements by officials, even fire chiefs, that their connections are standard or that they are of such and such dimensions cannot be trusted, though made in all good faith. The officials think they know, and while sometimes they are right, they are often wrong. Different pieces of apparatus and different lots of hose, frequently produce differing connections. The chief who says his department is all standard may have non-interchangeable hose in his central station and not know it, because the newest lot may be on a pumper and the older lot on a hose car or other apparatus and no occasion has arisen for piecing out the lines of one machine by lengths from the other.

One central station produced two measurements, another three. When the first few lengths of hose or the first one or two hydrants examined show uniformity, examination should be continued to other lots of hose and other makes of hydrants, to as thorough an extent as is permitted by the time available and the patience of the local officials. Half an hour's persistent work is more than likely to show the need of checking up everything and of standardizing it all accurately.

Two lots of hose in service in another central station, where everything was supposedly standard, were shown to be non-interchangeable. The astonished chief has agreed to use a set of tools as soon as it can be furnished to him and will standardize everything in his township, including private as well as public equipment. The chief of a department using


COUPLING
2½ IN NAT (AMER) STD FIRE HOSE
GO FIELD INSP MIN
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THIS GAGE MUST SCREW IN.
2½ IN NAT (AMER) STD FIRE HOSE
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THIS GAGE MUST NOT SCREW IN MORE THAN TWO (2) TURNS
2½ IN NAT (AMER) STD FIRE HOSE
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MINOR DIAM 2.8424 IN.
THIS GAGE MUST NOT ENTER COUPLING.
NIPPLE
PITCH DIA 2.9920
THIS GAGE MUST SCREW ON.
PITCH DIA 2.9980
THIS GAGE MUST NOT SCREW ON MORE THAN TWO (2) TURNS.
MAJOR DIA 3.0366 IN
THIS GAGE MUST NOT SLIP ON NIPPLE

Standard set of plug and ring gages for field inspection work. The dimensions marked on the gages represent the nominal size of the thread and not the actual size of the gages.

some standard hose and other hose considered interchangeable with it, just to prove that everything was satisfactory, made use of a standard test gage. The very first length he picked at random in the central station would not match up; the second also failed to pass. The set of tools was accepted on the spot and put to work as soon as the firemen could rig up the vise.

Such circumstances as these show not only that local information cannot be relied upon, but that it is necessary to test as many units as possible before feeling fairly sure that true standardization exists.

The State of Connecticut.

Connecticut has so far produced 41 different connections. The standard number of threads per inch was in use in 58 departments, 7 threads per inch in 40, 8 threads per inch in 84, 6 threads per inch in 1. There were 20 different diameters, ranging from 2¾ to 3 13/64 inches. Standard diameter with 8 threads per inch was the most popular combination, found 25 times; standard diameter, but with different threads, was recorded 50 times; 14 places with one connection each were all different; 30 departments operated with two connections, 11 had three, one had four and one village had five, counting both public and private. Hartford County had the worst conditions, with 31 different combinations. Now only two departments in it remain non-standard and they are ready

to change when tools are available. Out of 113 departments so far of record 60 have standardized.

A dozen departments were originally of record as standard, needing no attention, but examination has reduced their number to four, of which three still remain to be subjected to verification. The one place on this list which is definitely known to be standard is a comparatively small one, dominated by a carefully run mill which provides the public protection as well as its own. The eight places marked off the list have been using non-standard connections along with the correct standard, such as the Roxbury thread or some other type slightly different from the true standard. Some of the places knew it and some did not. Standard and two variations were brought to light in use in the central station of one supposedly standard place, which then checked up everything, public and private, and standardized accurately.

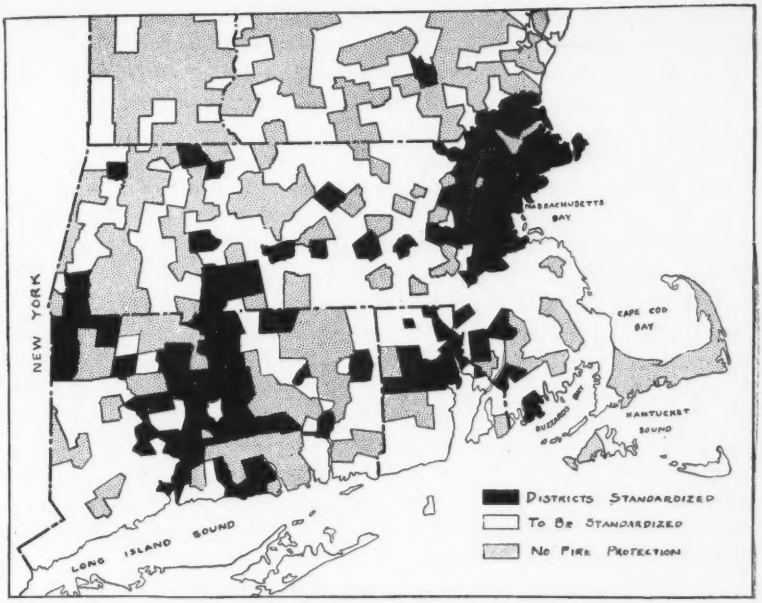
Typical Situations.

One carefully maintained plant had the only consistently accurate standard equipment found. Another plant, only a few miles away, where outside aid would come in with near-standard equipment, maintained a thread 2 13/16 inches in diameter with 8 threads to the inch.

In one small place the nearest public hydrant to a mill showed a diameter of 3 1/32 inches and 7½ threads to the inch, while a private hydrant in the mill yard showed a diameter of 3 inches and 8 threads to the inch. The fire station in a closely adjoining community produced connections with diameters of 2 31/32 and 3 inches, while the hydrant outside the station showed 3 1/32 inches diameter.

A prosperous place with a well rated department is surrounded by standard communities, but holds to a connection smaller than standard. It can give no aid to its neighbors and as the pressure in its business district runs high it is a question whether its neighbors' hose would hold on its hydrants. Efforts to interest the place in standardizing have so far been fruitless.

In anticipation of general standardization, the chief of a department which had been using hose having a clutch coupling and hydrants having outlets of sub-standard diameter, adopted the plan of buying all new apparatus and all new hose with standard fittings. Complete local standardization, now an accomplished fact, was long delayed, compelling the department to make use of various adapters to meet all the possible combinations of the three non-interchangeable connections in use at the same time, but in spite of the opportunities for trouble the department functioned successfully until, to the great relief of the chief, the day came when it could throw away the adapters and operate solely on a standard basis.



Map showing the extent of standardization in the most populous part of the New England States. This map was made from data furnished through the courtesy of the New England Insurance Exchange (Member N.F.P.A.).

Two fire districts in the same town maintained separate departments with non-interchangeable couplings, and did not supply adapters for all apparatus. Two fire districts in another town also maintained separate departments, but on occasion co-operated and supposed they had uniform equipment, until the better equipped district took charge of all fire service, when it developed that new hose of the smaller district would not fit on to that of the larger.

Two independent fire departments in the same town did not know whether they could interconnect or not. They were actually over-standard in diameter. A fire came at which they worked together, but outside equipment could not connect with them and the loss was total. A private equipment in the same town had three different nipples in as many double hydrants. All of these nipples were below standard and the hose connections were of the clutch type, requiring adapters.

Other Conditions Unearthed.

Standardization work has not alone brought to light cases where supposed standardization was not actual, but has in not a few instances demonstrated that other fire protection details were in bad order.

In an unprotected community two private plants across the street from each other maintained separate systems of protection. Plant A had four buildings with standpipes and interior hose. Plant B had outside hydrants and unlined hose. In Plant A the hose of Buildings 1 and 2 would not fit on to that in Buildings 3 and 4, being too small. The hose of Buildings 3 and 4 would not fit on to that of Buildings 1 and 2, being too large. The hose of Plant B fitted that of Buildings 3 and 4 of Plant A, but not that of Buildings 1 and 2, while none of the hose of Plant A would go on to the hose or hydrants of Plant B. None of the lot was standard.

Incidentally this inspection unearthed other defects. Out of six lengths of hose provided for standpipes in Buildings 1 and 2, no swivel would operate, washers were missing or useless, four male ends were in bad shape, two playpipes were missing, three playpipes would not connect up because of the condition of the coupling on the pipe or on the hose, and in the one case where a pipe would fit, the hose had a hole "mended" with a strip of adhesive tape. At least three of the lengths had holes, one was disconnected, with a play pipe which would not connect, and of the other two, classed at best as poor, one had no play pipe at all and the other had one which did not fit.

The water supply was from pressure tanks located in the basement, and pressure dropped to 35 pounds per square inch before the pump started. The capacity of the latter was only 35 g.p.m. Redeeming features of the situation were a request from Plant A for recommendations for the most necessary immediate changes and a decision by Plant B to standardize when tools are available.

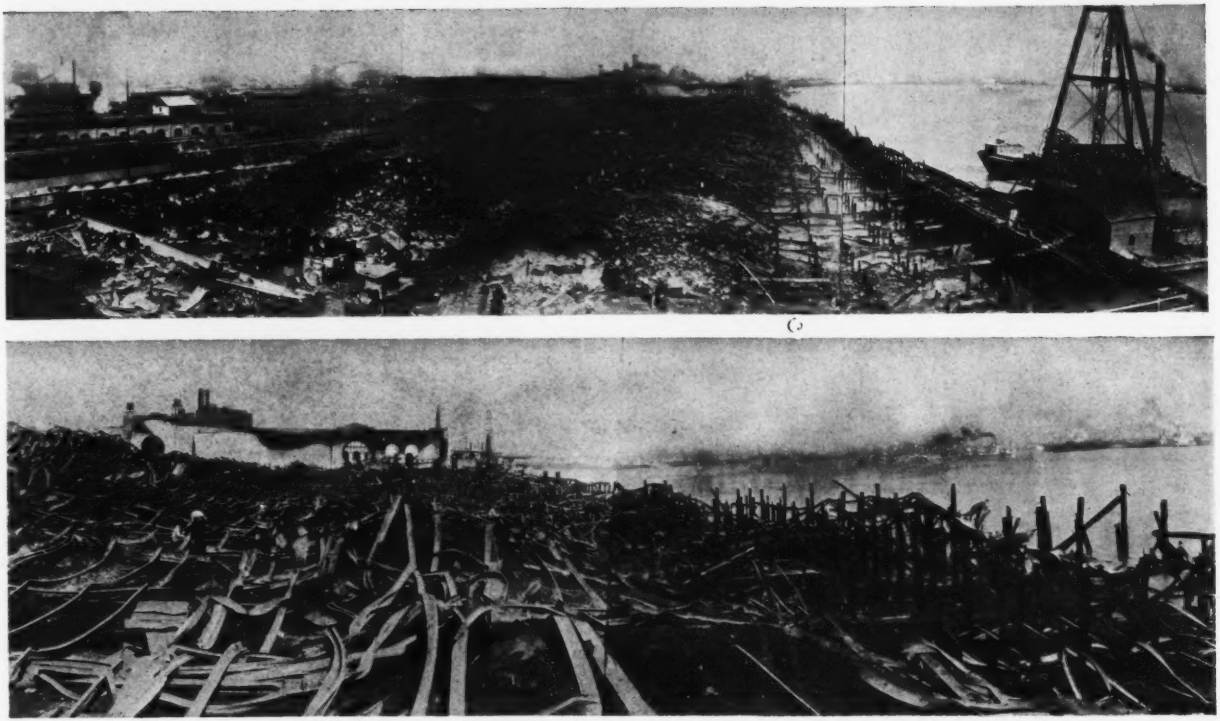
The first hydrant examined at another mill showed 7½ threads to the inch and only 1/64 inch under standard diameter. "Good enough" was the verdict, but just to be safe the next hydrant was examined. That outlet was also 1/64 inch "off," but this time was over-size. At a third hydrant the cap was "frozen" so tightly on one outlet that the first wrench used was broken without stirring it. Strenuous efforts with a second wrench unscrewed the nipple and cap as one unit. Some nipples were found to taper with the larger end at the barrel of the hydrant, reducing towards the discharge end. This inspection showed independent valves on the outlets where the groove at the bottom for the sliding portion of the valve to enter was so located in most cases as to collect dampness and rain water and freeze tightly in winter, so that the valve became inoperative and the hydrant useless.

At this same mill, hose was located in houses over two hydrants, but was not attached to any outlet, being left rolled up in individual lengths,

dirty and in one case oil-soaked. There were six play-pipes provided in each house, a total of 12, but the combined rated capacity of the mill's two pumps, which had to care for a sprinkler tank as well as these hose streams, was only 1100 g.p.m. Printed notices at the mill entrance instructed the pump men to start only the smaller pump (capacity 350 g.p.m.) first and not start the larger one (capacity 750 g.p.m.) until the pressure in the pump room had dropped to 35 pounds per square inch. The pumps were within the building and could not be started from outside. "The pumps used to be run and hose operated," said the manager, "about once in four years, up to this season. Now it's done once a year." The plant was listed for standardizing and, incidentally, a more strict inspection than it appeared to have been getting.

Conclusions.

Although previously mentioned, it may be in order to conclude this story with a summary of the conclusions which these "adventures in standardization" have engendered. First, the plug and ring gages provide the only reliable method of testing threads; second, local testimony, though made in good faith, should not be relied upon; and third, any check-up should be complete or involve as many units as possible.



Photographs by G. R. Hurd (Member N.F.P.A.), Ill. Central R.R.

Two views of the burned wharves at New Orleans looking north toward the fire wall which finally stopped the fire. The upper picture, taken from near the point of origin of the fire, shows the extent of area burned; the fire traveled thirteen hundred feet before reaching the fire wall. The lower picture, taken from nearer the fire wall, gives the detail of the ruins.

New Orleans Wharf Fire.

By Walter K. Grant (Member N.F.P.A.).

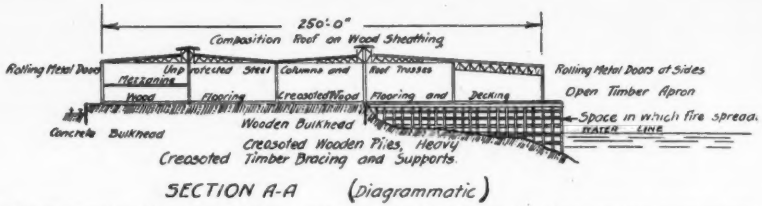
Louisiana Fire Prevention Bureau.

The largest fire reported during the year 1925 occurred the night of November 17, when the destruction of two public wharves and their adjacent structures at New Orleans caused a loss estimated at $4,000,000. The two large wharf sheds contained coffee, lard, alcohol, soap, lumber and miscellaneous cargoes, all valuable. Fourteen loaded freight cars were burned and one ship caught fire and was only saved from severe damage by being towed into midstream where its crew extinguished the fire.

Brief Description.

The destroyed sheds, as shown in the accompanying diagram, were located on the east bank of the river and extended from the foot of Poydras St. to Notre Dame St., a distance of approximately 1,300 feet. There were no exposures of importance. The sheds were of the usual type of construction, one story high, with metal sides and ends, tar and gravel roofs on wood sheathing, this in turn was supported on unprotected steel purlins and trusses and unprotected steel columns. The floors of the sheds were mainly of wood. Where the sheds overhung the levee they were connected by an open wharf supported by the usual heavy creosoted timber and creosoted piling construction. They formed, with the open wooden wharf on the river side of the sheds, a continuous fire area without retarding walls or draft stops of any kind, either above or below the wharf deck. Fire protection facilities available consisted of casks and pails spaced every 60 feet along the roadway through both sheds, auxiliary and master fire alarm boxes, hose houses, with good minor equipment, public hydrants near the sheds, a public fire department, a fire boat, watchmen of tenants and contractors, and harbor police patrol.

The open wharf between the Julia and Girod Street sheds was undergoing reconstruction, and the decking had been removed. The lower end of the Julia Street shed was undergoing remodeling to permit a switch track curve to be built on the wharf. There were two auxiliary boxes and one master fire alarm box in the Girod Street shed. One auxiliary box was at the upper end, another was approximately in the middle of the shed mounted on a steel column alongside of the roadway, and the master box was mounted on the outside wall on the lower end of the same shed. None were made conspicuous by red lights, but were designated by signs in large letters. The sheds were lighted by electricity.



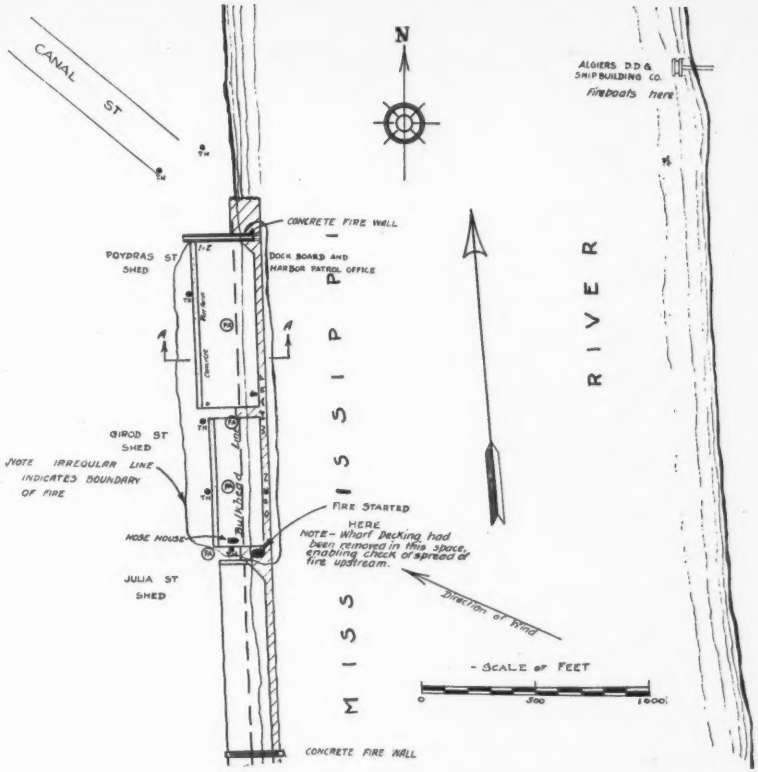
SECTION A-A (Diagrammatic)

Cross-section diagram of the destroyed sheds shown in plan on the next page.

At the time of the fire, the river was at a stage that brought the water level about 16 feet below the outermost edge of the wharf and left about 10 feet of land on the river side of the wooden bulkhead (see diagram above). The larger of two municipal fire boats, the "Deluge," had been in dry dock for a week at least and was located on the opposite side of the river, unavailable at the time of the fire. The "Samson," a smaller fire tug, was moored at the Algiers dry dock directly opposite the fire, but also across the river. The wind was blowing six miles an hour from the southeast at the time the fire began.

Story of the Fire.

After attending to some special duties such as "spotting" some particular cars of material, the watchman employed by the wharf contractors retired to the office built in the Julia Street shed and after eating some lunch issued therefrom at about 10:45 P. M. and discovered a fire on the upper end of the Girod Street shed, beneath the open decking, among the piles on the river side of the wooden bulkhead. He called to another watchman inside the closed gate of the Girod Street shed to turn in an alarm. This second watchman traversed nearly the length of the Girod Street shed to report to his roundsman, who in turn traversed about 800 feet to report to the Harbor Police operator who, after telephoning the "Samson," telephoned the fire alarm office, which office telephoned the Insurance Patrol and Engine No. 5 at Julia and Magazine Streets at about 11:03 P. M. These companies responded promptly and the Insurance Patrol was able to attach a line of hose to a public hydrant in the roadway between the Julia and Girod Street sheds, being forced to break open a hose house to get the hose. About the same time, firemen from Engine No. 5 joined the Insurance Patrol crew with their own line from another hydrant farther removed. In the meantime, the officer in charge of Engine No. 5 immediately caused the fire alarm box at Julia and Water Streets to be pulled, which signal was received at the fire alarm office at 11:08 P. M. Four additional engine companies, one truck company, one chemical company, one tower company, one squad wagon, chief and first assistant engineer responded. A general alarm at 11:16, a repeated general alarm



Sketch of the Poydras and Girod Street sheds, New Orleans, La., showing the docks destroyed November 17, 1925.

at 11:32 with three other calls for extra companies at 11:40, 11:48 and 11:53, brought out additionally eleven engine companies, one other tower company, four hose companies, and a second water tower. By this time, however, the blaze had gotten beneath the wooden flooring of the sheds and open wharf, igniting the piling and beams and joists, augmented by the wind that was blowing inshore and slightly downstream. A "chimney effect" beneath the flooring, caused both by the natural and induced drafts, greatly increased the temperature and caused a quick vaporization of the creosote impregnated in the wooden timbers, adding to the flames and causing them to burn through the wooden decking and get into the sheds above. The chimney effect within the sheds was greatly intensified by the closed side walls so that the fire spread with amazing rapidity, involving both structures within the space of about thirty minutes. The concrete

View looking north, downstream, taken while the fire was burning itself out. It shows the effect of fire on unprotected structural steel. This is a type of construction not infrequently referred to as "fireproof."

wall on the lower end of the Poydras Street shed, particularly that portion beneath the wharf, was instrumental in retarding the spread of the fire along and beneath the open wharf at the foot of Canal Street.

Cause.

The origin of the fire has not as yet been definitely determined. It was brought out in an investigation that an oil lantern had been used at times as a danger signal on the upper end of the Girod Street wharf while the wharf was undergoing remodelling and repairs, but no evidence has been introduced to show that it had been used on the night of the fire. On the day of the fire, an oxy-acetylene torch had been used by workmen employed by the contractors to cut or repair the steel members of the Julia Street shed, but these men had quit at about 5:00 P. M.

Conclusions.

This fire shows the importance of properly instructing watchmen, no matter by whom employed, in the use and location of fire equipment, and the advantage gained by a vigilant watch and patrol system under central station supervision with a sufficient personnel to cover properly and systematically the entire water front property at frequent intervals, day and night. Equally obvious from this fire is the fact that the telephone is not to be relied upon for the quick transmission of alarms. Boxes, though provided and very well spaced in this location, were not made conspicuous by red lights; it is probable that had they been, they would have been utilized, and regular box response been made at the beginning of the fire, before it got under the wharf. After this condition obtains, as has often been demonstrated, the fire department is powerless to extinguish a blaze of this kind, no matter how quickly men and apparatus respond.

The fire again illustrates the need for fire-resistive construction beneath the flooring of the sheds and wharves with frequent fire walls to break up the chimney effect that causes such intense heat and forces the fire to travel with such rapidity. This is demonstrated in the action of such a wall on the lower end of the Poydras Street shed, where that portion of the ornamental facade beneath the wharf stopped the fire from spreading under the open wharf at the foot of Canal Street.

The private equipment available was probably adequate to extinguish, or at least control, the fire in the beginning, but no use was made of it. The delay in sending in the alarm to the fire department was largely instrumental in allowing the fire to gain headway and finally sweep beneath the wharf. Another contributing factor to the delay in fire department operations was the blocking of the apparatus by freight cars at several points as engine crews endeavored to remove them.

According to press reports and other evidence, burning brands were carried a distance of about six or eight blocks into the congested value district where a potential conflagration was averted by incombustible roof coverings. Also, had not the decking beneath the Julia and Girod Street sheds been removed at the time, thereby breaking up the draft conditions, the fire could have spread up stream and involved the Julia Street shed, even in the face of the slight wind that was blowing at the time.

Contemplated Improvements.

It has practically been decided in rebuilding these burned sheds and wharves to adopt superior construction. The sub-structure of docks and flooring of the wharves where overhanging the levee will be constructed of steel columns. Girders and sway bracing will be fastened to concrete caps and struts resting on wooden pilings, the tops of which will be cut-off below extreme low water. Flooring, bulkhead and the wharf above will be of reinforced concrete slab construction. Sheds will be of the usual one-story type, tar and gravel roof on wood sheathing, this in turn on unprotected roof trusses, supported by unprotected steel columns. In addition the sheds will be divided into two sections by a reinforced concrete fire wall, with approved automatic double fire doors on all openings. This wall will be located on the proposed Girod Street shed as nearly equidistant as conditions will permit, between the lower end of the Poydras Street shed and the fire wall in the Julia Street shed. Fire alarm telegraph service will be replaced in practically the same locations; no present enlargement of the personnel of the Harbor Patrol is contemplated.

Salvage Inspections.

By Frank C. McAuliffe (Member N.F.P.A.).

Chief of Patrols, Chicago Salvage Corps.

Inspection by fire department officers and fire prevention inspectors has been given considerable thought and is common practice in many cities. These inspections are made from the standpoint of fire prevention, control and extinguishment, and little or no thought is given to the question of salvage at fires.

Fire prevention inspectors and fire department officers should have a knowledge of the conditions which prevent efficient salvage operations at fires and make an effort to correct these conditions when found on their tours of inspection.

Shelves and wall cases improperly constructed are the cause of large water losses. Shelves are frequently built to the ceiling directly against a wall. Stock is placed in the shelves against the wall, making it impossible to salvage unless such material is removed. Water following the wall will wet the contents. Shelves should be constructed with a backing of wire netting about two inches from the wall, allowing a space of 18 inches at the top to draw a cover over and down in the rear of the shelves for at least a few feet. Water following the wall will then pass harmlessly to the floor.

A salvage company is seriously hampered in its work when tops of cases are covered with stock. It becomes necessary to remove such merchandise before the case can be properly covered. With time an important factor a delay of this nature often results in unsatisfactory salvage work. Stock should never be piled on top of wall cases; additional shelves should be constructed for this purpose.

One of the most common obstacles to efficient salvage work is stock piled on floors without skids of any kind. It is practically impossible to salvage the lower portions of such piles when large amounts of water are used in extinguishing a fire. Stocks piled in paper boxes or cartons when wet on the bottom frequently overturn and ruin the entire pile, notwithstanding perfect covering of the boxes by the salvage corps. In fire-resistive sprinklered buildings, through the same cause, the opening of one or two heads often creates a large water loss to goods on the fire floor many feet away from the fire. In many factories material used in the manufacture of the finished product is allowed to lie upon floors after

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From a paper read at the convention of the International Association of Fire Engineers at Louisville, Kentucky, September 30, 1925.

working hours when it would be possible and practical to gather all such material and place it upon tables and benches in a neat and orderly manner.

Not only in case of fire would this practice prove of value. Frequently careless tenants above allow sinks or other plumbing fixtures to overflow. Roof drains clog, or roofs leak and during rains or winter thaws serious water losses occur. In case of fire the owner is usually protected by insurance and is, therefore, inclined to become careless in the protection of his property. Should he be informed of the number of losses which occur from the above mentioned causes he would undoubtedly insist on salvage protection measures.

It is claimed by many persons and firms that skidding stock is impractical on upper floors, particularly where stock moves quickly. At large fires the water in the basement frequently rises above ordinary skids and, therefore, such skids are condemned. This is true to a certain extent. However, if stock in basements were skidded four or five inches and stock on upper floors two inches, it would prove a protection in 90 per cent of the fires likely to occur. The nature of the stock and general conditions as to the feasibility of skidding should receive the attention of the inspector in seeking a method of protection.

During salvage operations at fires it is often impossible to locate basement drains and catchbasins, particularly when the floor is covered with water. Stock is frequently piled upon them, making such drains and catchbasins exceptionally difficult to locate. This practice also makes it necessary to remove stock directly over drains. In many cases the removal of stock to make a passageway to an aisle is also necessary. The inspector should request such drains be kept clear and that signs be hung on the ceiling showing their location.

In sprinklered buildings the shut-off valves should be plainly marked and in case dry valves are used the telephone number of the engineer or other person responsible for the system should be plainly set forth so that the salvage corps can seek his assistance in an emergency. Stock and fixtures should be arranged in such a manner that sprinkler valves are noticeable and accessible. A small indicating light at basement valves proves an aid in preventing unnecessary water damage.

Certain classes of occupancy, due to the nature of the stock carried, present difficult conditions for the efficient laying of covers. Crockery and glassware, lamps, vases, statuary, antiques and similar fragile merchandise, when arranged on tables, cannot be covered without breakage, unless provisions are made for such work. A pipe rack carried above the center of the tables can be used to hang articles on display and by the salvage corps in protecting against water damage and breakage.

Floor lamps and other stock easily tipped and broken frequently present a similar unsatisfactory salvage situation.

The average business man has no knowledge of salvage work. His stock and fixtures are, therefore, arranged disregarding the serious consequences of water loss in the event of fire. Should they understand the operations of a salvage corps they would arrange their stock and fixtures in such a manner that the corps could efficiently protect them against water damage should the need arise.

Fire department officials should enlighten the public on these points so that they can prevent water damage as well as fires.

State Legislation on Fire Extinguishers.

From a Compilation by D. S. Hunter (Member N.F.P.A.).
Secretary, Fire Equipment Manufacturers' Institute.

This compilation includes only state legislation, but should be of interest in showing a need for uniform laws on the subject. While it is fairly complete, this compilation is not presented as exhaustive, as data on 17 states and the District of Columbia is missing. In the remaining 31 states, the statutes of 19, as far as could be determined, make no reference to fire extinguishers. Twelve states have the requirements listed below.

Idaho.

HOTELS

Compiled Statutes, 1919. SECTION 1799. Fire extinguishers and hose. Each and every hotel shall be provided with at least one efficient chemical fire extinguisher, approved by the National Board of Underwriters, for each 2500 square feet or less of floor area, which extinguisher or extinguishers shall be placed in a convenient location in a public hallway outside of the sleeping rooms, and in all public rooms, and shall always be in a condition for use; or, in lieu thereof, such hotel shall be equipped with a standpipe at least 1¼ inches in diameter, with hose connection and hose of sufficient length, always attached in the hallway on each floor, which standpipe shall be equipped with a sufficient pressure of water at all times.

Indiana.

DRY CLEANING ESTABLISHMENTS

1921. SECTION 7441 G 1. Dry Cleaning Establishments. One approved hand chemical extinguisher especially efficient for such conditions shall be provided for each 500 feet of floor space.

Michigan.

HOTELS

Compiled Laws, 1915. SECTION 6934. Each and every hotel shall be provided with at least one sufficient chemical fire extinguisher for every 2500 square feet or less of floor area, which such extinguisher or extinguishers shall be placed in a public hallway outside of the sleeping rooms, and shall always be in condition for use.

MINES

Compiled Laws 1915. SECTION 6950. Provides for fire extinguishers (2) at mines.

TRACTION ENGINES

Compiled Laws 1915. SECTION 7368. Provides for fire extinguisher on traction engines.

Mississippi.

PLACES OF PUBLIC AMUSEMENT

Annotated Code, 1917. SECTION 4640. Places of Public Amusement. * * * * All reasonably practicable arrangements shall be made for the supply of water or other means for extinguishment of fires, and they shall be kept constantly effective during the presence of the audience.

Missouri.

FACTORIES

Revised Statutes 1919. SECTION 6790. Fire Escapes in Factories. * * * * Each story shall be amply supplied with means for extinguishing fire.

HOTELS

Revised Statutes 1919. SECTION 5877. Fire Extinguishers. Each and every hotel shall be provided with at least one efficient chemical fire extinguisher for every 2000 square feet or less of floor area on each floor, of a style and size approved by the National Board of Fire Underwriters, which such extinguisher or extinguishers shall be placed in a convenient location, or in a public hallway outside of the sleeping rooms and shall always be in a condition for use; or in lieu thereof, such hotels shall be equipped with a 1¼ inch standpipe with hose connection in hallway on each floor and hose of sufficient length, always attached, which standpipe shall be supplied with a sufficient pressure of water.

PLACES OF PUBLIC AMUSEMENT

Revised Statutes 1919. SECTION 10969. Places of Public Amusement. * * * * All reasonably practicable arrangements shall be made for the constant supply of water or other means for the extinguishment of fires, and they shall be kept constantly effective during the presence of an audience.

North Carolina.

PLACES OF AMUSEMENT

Consolidated Statutes, Vol. 2, 1919. SECTION 6082. Places of Amusement. * * * * All reasonably practical arrangements shall be made for the constant supply of water and other means for extinguishment of fires, and they shall be kept constantly effective during the presence of an audience.

North Dakota.

HOTELS

Compiled Laws, 1913. SECTION 2981. Fire Extinguishers and Standpipes. Each and every hotel shall be provided with at least one chemical fire extinguisher, approved by the National Board of Underwriters, for every 2500 square feet or less of floor area, which such extinguisher or extinguishers shall be placed in a convenient location in a public hallway outside of the sleeping rooms and shall always be in condition for use (or in lieu thereof standpipe and hose to be provided).

New York.

OMNIBUSSES

New York State Traffic and Motor Vehicle Code. SECTION 286, Paragraph 11. Every omnibus operating on the public highways of the State having a carrying capacity of ten or more passengers, shall be equipped with a fire extinguisher of a type to be approved by the Commissioner.

THEATRES AND ASSEMBLY HALLS

State Standard Building Code for Places of Public Assembly. PART III. Rule 331. (a) Approved two and one-half gallon chemical fire extinguishers shall be provided as follows:

For Theatres: One on each side of stage, one under stage and one in each fly gallery. One in each property room and store room. One in each workshop. One near the dressing rooms. One in each tier of the auditorium.

For Assembly Halls: One in or near the stage or platform. One in each tier of the auditorium.

(b) Extinguishers shall be exposed to view, be readily accessible, be maintained in operative condition, and re-charged at least once a year.

(c) *Water Pails and Cask:* On the stage of every theatre there shall be provided one (1) forty (40) gallon cask filled with water, and six (6) metal fire pails. Such cask and pails shall be painted red and lettered "FOR FIRE PURPOSES ONLY."

Pennsylvania.

MOTION PICTURE BOOTHS

Complete Statutes, 1920. SECTION 21162. Every moving picture booth shall be provided with not less than one approved one-quart fire extinguisher of the pump type. * * * * SECTION 21163. Provided, that this section shall not apply to cities of the 1st and 2nd classes. (Philadelphia and Pittsburgh are the only cities in those classes.—ED.)

THEATRES

Complete Statutes, 1920. SECTION 10914. Paragraph 2. Theatres. * * * * There shall also be provided for each side of the stage not less than two chemical fire extinguishers and casks (of water) shall be kept free from any obstruction and in readiness for immediate use at all times.

STATE POLICE AUTHORITY

Complete Statutes, 1920. (Not changed by Amended Act of 1925.) SECTION 10925. The department (of state police) may also adopt and enforce rules and regulations requiring the placing of fire extinguishers in buildings.

Virginia.

HOTELS

Annotated Code, 1919. SECTION 1587. Every hotel shall provide each floor with one or more fire extinguishers, to be kept in working order at all times.

Washington.

HOTELS

Compiled Statutes, 1922. SECTION 6873. Each and every hotel shall be provided with at least one efficient chemical fire extinguisher for every 2500 square feet or less of floor area, which extinguisher or extinguishers shall be placed in a convenient location in a public hallway outside of the sleeping rooms, and in all public rooms, and shall always be in condition for use (or standpipe and hose in lieu thereof).

West Virginia.

HOTELS

Annotated Code, 1913. SECTION 625. Every hotel shall be provided with one fire extinguisher of a style and size approved by the National Board of Underwriters, on each floor containing 2500 square feet of floor area; and one additional fire extinguisher on each floor for each additional 2500 square feet of floor room, or fraction thereof. Every such extinguisher shall be placed in a convenient location in the public hallway, outside of sleeping rooms, at or near the head of stairs, and shall always be in condition for use.

States Without Fire Extinguisher Laws.

In the following states no legislation referring to fire extinguishers could be found:

Arkansas	Florida	Montana	Texas
Arizona	Georgia	Nevada	Utah
Colorado	Louisiana	New Hampshire	Vermont
Connecticut	Maine	New Mexico	Wyoming
Delaware	Maryland	Rhode Island	

Council Bluffs Conflagration.

Report by Iowa Insurance Service Bureau.

(Member N.F.P.A.)

On December 3, 1925, Council Bluffs, Iowa, experienced a conflagration which commenced with an explosion in a furniture store in the early morning. In little over three hours, before the fire was brought under control, the building in which the fire started, a large hotel and four office buildings had been completely gutted and damage had been done which is estimated at not less than $700,000.

Cause of the Fire.

The cause of the fire was probably an explosion of Blau gas. One part of the furniture store building in which the fire started was devoted to the sale of Blau gas equipment and a typical installation had been set up there for demonstration purposes. Several reserve tanks of the fuel were stored in a compartment under the sidewalk which compartment communicated with the basement of the building. On a previous occasion gas had escaped from a cracked pipe in this equipment but had been ventilated out before any trouble developed. The explosion occurred when the night watchman went to the basement to stoke the boiler fire. It took place before he had reached the boiler and apparently almost as soon as he opened the door to the boiler room. The watchman was so severely injured that he can give no coherent report of events previous to the explosion or tell how he reached the street. All of the fuel tanks were empty after the fire, the gas having escaped through the vents provided for relief, but at what time the fusible plugs which controlled these vents gave way is not known.

The Council Bluffs, Iowa, conflagration at its height. The fire started in one of the buildings at the right and developed the proportions shown in less than one hour. In the foreground is the Grand Hotel ablaze.

The furniture company building was an ordinary joisted brick structure of three stories and basement situated in a narrow block with frontages of 75 feet on both Pearl and Main Streets, and 100 feet of depth. It was an undivided fire area with unprotected floor openings. The entire building was used as retail store with a general stock of furniture, carpets, stoves and house furnishings. Solid 12 and 16 inch brick fire walls separated it from adjoining buildings on both north and south.

The Grand Hotel was a four and seven-story joisted brick building of an old type of construction and a landmark in local history. Walls were of the heavy bearing type 12 to 28 inches in thickness; some floors were supported by bare steel beams; it was an undivided fire area of about 13,000 square feet. Two open elevator and two open stairway shafts of generous size extended the full height of the building. There were 118 hotel rooms and three office rooms in the building.

The other buildings involved were of ordinary joisted brick construction, two to four stories in height, of moderate area, with solid party walls but unprotected openings in walls at front and rear.

Story of the Fire.

The explosion gave the fire an unusually good start: its violence and the fact that floor openings were unprotected, spread the fire rapidly through the furniture company's building. The fire spread to buildings on both sides of this one in spite of fire walls. These adjoining buildings were destroyed.

Another view of the fire when it was practically under control. Six buildings were entirely gutted in a little over three hours.

Within 30 minutes after the fire started it had jumped the 66 foot street and was rapidly enveloping the Grand Hotel. This hotel was of the type which is built to burn, which it rapidly did. Fortunately loss of life, probable in a building so constructed, was avoided, although many of its guests escaped with but little other than their sleeping clothes.

The fire was fought by the local fire department, which is equipped with two pumpers, three combination cars and an aerial ladder truck. The entire equipment was brought into use, manned by the permanent fire force of 37 men. In addition, two engine companies from Omaha, Nebraska, which is just across the Missouri River from Council Bluffs, came to help the local forces. The Omaha pumpers got into operation after some delay caused by their having to use double suction lines of 2½ inches in place of their ordinary suction hose which could not be connected up to local hydrants because the hose and hydrant threads of the two cities are not interchangeable.

No shortage of water was experienced by the fire departments, although one company was twice forced to stop the pump to remove gravel from the suction strainer. This district is supplied through 12 and 16 inch mains from a pumping station and an elevated reservoir providing a normal pressure of about 85 pounds per square inch.

That the fire was confined to the six buildings that it was, was probably due to the strenuous efforts of the fire forces and the fact that their facilities were adequate.

Madison, Wisconsin, Theatre Fire.

On Saturday evening, October 24, 1925, the Parkway Theatre in Madison, Wisconsin, took fire during a performance. Many of the factors which contributed to the famous Iroquois Theatre holocaust of December 30, 1903, were present. Serious results were avoided largely because it was near the supper hour and a "movie" not especially popular was being shown. The theatre was not crowded, there being not many more than 500 people present.

No report of this fire has been received from any of the usual sources, but the lack of an expert's report on this fire is more than made up for by the following story of the fire taken from a letter of a scientist connected with the Forest Products Laboratory in Madison, who was an eyewitness of the fire. She writes:

"The Parkway is the largest theatre in town, and in it are given the big college plays. I have seen it jammed to the doors with students.

"I am told it has burned three times so far. The second time it was remodeled all but the stage and dressing rooms. These were of wood, some one told me, dirty and rat ridden.

"A friend and I saw the beginning of the fire from seats in the front row of the balcony near the center. The fire started on the stage, while a fashion show for men was being shown. A large show case occupied the center rear, in which curtains of gauze hanging down from the top were used to represent glass. The case was lighted by electricity and three young men acting as mannikins were in it. The fire started beside this gauze curtain, but not near the wall of the stage at the back. It was small and clear and at first I thought it was part of the show and that there would be colored lights. The flames became larger and a man attempted to smother them. They ran up the curtain.

"At this point we left our seats and walked to the stairway. Many of the people had risen, but I expect they felt as we did; they had paid their money and they wanted to see the show. While we were walking to the stair, the stage hands lowered a curtain which was not asbestos. By the time we had reached the head of the stair this had caught fire and was bellying out toward the audience. One of the actors had come out and talked to the people. Most of the audience in the balcony had risen from their seats by this time and some were walking toward the stairs. We did not hear the man, but according to those down stairs he told them to sit down. We walked down before the rush began. After reaching the street

we held open one of the glass street doors. By this time the smoke could be noticed at the street and the people were crowding out. The audience was not frightened, no one called 'fire,' they came out in good order and some of the faces had a look of pleasant excitement. They were as a rule young, and more men than women. We estimated they were out in between five and ten minutes.

"A friend sitting down stairs said that when the curtain caught fire it blew out into the theatre with the flame and smoke. The lights went out and they had to leave in the dark except for the light of the flames. She said the flame and smoke rose to the ceiling and swept over to the balcony. A strong wind blowing from the stage seemed to push them towards the exits. The only persons hurt were in the balcony. Two small children were there without an older person. The small girl said they had remained seated when the actor told them to sit down. They were slightly burned before they tried to leave. The other, a student of eighteen years, was with a younger brother and lost him in the final rush. He stayed behind and was severely burned about the head and hands. The newspapers said that when the actors ran out they left the stage doors open and this together with the ventilating fans caused the blast of flame and smoke. The spread of the flames was surprisingly, frightfully rapid.

"The fire chief said next day that every seat in the theatre was scorched and many in the balcony burned. The ceiling and walls were scorched, while the roof over the stage and all the back part of the theatre was burned away.

"We watched the firemen fight the fire from across the street and saw the smoke coming out beneath the roof, where the ventilating fans continued to work for some time. The fire was spectacular, the flames rising high into the air and sparks flying in the wind to other buildings, which had firemen stationed on them to watch.

"The newspaper reported that the fire started from an electric switch box."

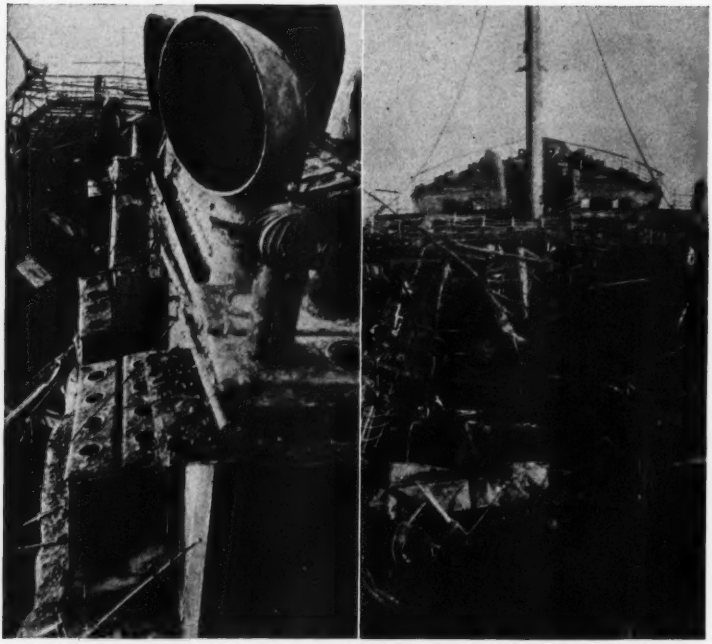
S. S. Lenape Fire.

Report by A. J. Smith.
Secretary, Marine Committee, N.F.P.A.

The S.S. Lenape, of the Clyde Line, was destroyed by fire at Delaware Breakwater on the night of November 17, 1925, with a loss estimated at $3,000,000. One life was lost, that of a man who became panic-stricken and jumped overboard as flames burst through the deck while passengers were being taken off. The remaining three hundred and sixty-seven persons, passengers and crew, were taken off safely. A dozen sustained burns and other minor injuries.

The Lenape was a coastwise passenger and freight steamer of the shelter deck type, built at Newport News in 1912, 381 feet long by 50 feet beam by 22 feet depth of hold (that is, to the main structural deck). She had a 4,000 H.P. triple expansion engine and four single end Scotch boilers, burning fuel oil. There was a double bottom under the machinery space and a deep tank for fuel oil in the after end of the fore-hold adjacent to the fire room bulkhead. The vessel had four water-tight bulkheads extending, however, only to the structural deck (at which the depth is taken), forward collision, forward machinery space, after machinery space and after collision. There was a lower 'tweendeck forward and aft. The structural deck was a tight steel deck and above that was the shelter deck of wood laid on steel beams with steel sides extended up thereto but pierced by several large cargo ports through which the freight was worked. There was a hatch forward in this shelter deck but none aft. Above the shelter deck were the passenger accommodations with some steel framing but practically all wood joiner work.

The vessel left New York at 2:00 P. M., November 17, and at 10:00 P. M., while running off the lower Jersey coast, fire was discovered aft. Whether this fire originated below the main deck and worked up into the 'tweendecks or originated at the 'tweendecks where there was no bulkheading from stem to stern has not and probably never will be definitely determined. The fire was attacked by the ship's hose working from the machinery space at the 'tweendecks and seems to have been kept, at least to a degree, under control until the vessel made the Delaware Breakwater, about 1:00 A. M. on the 18th. The ship was fitted with steam smothering lines according to law both in the holds and shelter deck space, though but one 1½ inch nozzle about abreast the engine room was supposed to supply the entire shelter deck space. Hose equipment was provided as required by law. When the vessel was grounded at Delaware



Views on the deck of the burned S.S. Lenape. Left, looking aft from the starboard side of the boiler room hatch. Right, looking forward. (See also Frontispiece.)

Breakwater, with wind abeam, the fire almost immediately broke out again, and it is said that within fifteen minutes had run from end to end of the vessel. The passengers and crew got off to Government vessels which stood by in answer to the S.O.S. sent out, but their margin of safety in point of time was practically nil. The vessel was not scuttled but beached, and as she burned gradually lightened and floated and again beached and burned out. Apparently the fact of the outbreak of fire immediately after the first beaching was due to having run before a breeze and brought up suddenly in a position where the same breeze acted as a draft. From the outset fighting this fire was all but a hopeless task as the 'tweendecks with wood structure overhead were filled with miscellaneous package cargo and were almost inaccessible to manual fire fighters with any apparatus and once out of control would and did sweep the entire length of the open 'tweendecks in a very short time. Eventually the fire struck through the hatches to the holds and made a complete job.

The cargo carried was about as miscellaneous as was ever put on a vessel and no stowage plan to our knowledge is available, possibly indi-

cating that none existed as these vessels are loaded rapidly for short runs and it is doubtful if the same care in segregation and stowage is exercised as would be for a long deep sea voyage. Among the articles on board were a small quantity of varnish, considerable paint in boxes, drums and kegs, coils of manila rope, paper in bundles and paper bags, cotton piece goods, carpets and rugs, cylinders of acetylene gas, barrels of raw linseed oil, used automobiles, groceries, hardware, electrical supplies and almost anything else that could be mentioned. A number of these articles, it is probable, aided the conflagration which started possibly from our old "friend" a cigarette butt or carelessly thrown match. There is no evidence one way or the other of stowage that would be liable to spontaneous ignition.

Pipe Covering Fire Hazards.

It is common practice to cover insulating materials on steam pipes, flues from high pressure boilers, etc., with canvas or other cloth outer covering, either for the purpose of holding the asbestos or magnesia insulating material in place or for the sake of appearance. This practice would appear to violate the letter of the requirements of the N.F.P.A. Field Practice Inspection Manual, the recommended Building Code of the National Board of Fire Underwriters and other rules which provide that no combustible materials shall be placed within certain specified numbers of inches of such pipes. Apparently the authorities have been inclined to consider that these combustible outer coverings should be classed as part of the incombustible insulating material and have not ruled against their use. This would indicate that there has been little unfavorable experience from the use of this comparatively small amount of combustible material on the outside of an insulating covering.

In the case of boiler breechings, forced draft flues, etc., temperatures of from 600 to 1000° F. are reached. Common practice is to cover the breechings with an asbestos or magnesia cement plaster from one to three inches in thickness, this material being applied with a trowel and presenting after completion a hard smooth finished surface. This is sometimes covered with canvas. A correspondent states that in his opinion this is an unnecessary hazard as the expansion of the metal breeching when heated, in time produces cracks through the cement which would permit of heat transmission to the canvas cover.

A fire reported in a sugar refinery building some years ago is of interest in this connection. In this case the heat from a steam pipe ignited the insulating covering, which consisted of an inner coating of asbestos

plaster, covered with hair felt and cotton duck. Sprinklers extinguished the fire before it had burned far enough to destroy the evidence of its origin.

Two fires reported from Worcester, Massachusetts, last winter, are also of interest, although occurring under slightly different conditions. Both of these started in a cheesecloth covering over asbestos insulating material. These fires are described as follows:

The first was in a three-apartment building on December 28, 1924. This fire originated from a steam pipe being in close proximity to the smoke pipe of the boiler. The two pipes run parallel for a distance of about fifteen feet and not over three inches apart. One cold morning a tenant went to the basement to push the fire to heat up the house and while he was in the cellar the cloth covering of the steam pipe blazed up and the flame ran along the pipe so rapidly that he ripped the covering off for some distance before getting it out. No other damage resulted.

The second fire occurred on January 3, 1925, in a dwelling. In this case the steam pipe was nearly a foot away from the smoke pipe and as the people had been burning papers and kindling in the furnace it is inferred that the covering caught fire from a spark which came out of the boiler, rather than overheating of the smoke pipe. In this case the evidence is pretty clear, although no one was in the cellar to see what happened, that the covering of the pipe caught fire a little above the boiler, ran along the pipe, up to the floor joist, setting the floor joist afire and this burned up into the first floor somewhat. It was discovered soon enough so that the loss resulting was less than $100.

Individual Liability Upheld.

During the past year, several court cases have further established the principle that an individual is liable when his negligence causes a fire. Two of them on which data is available are summarized here.

San Antonio, Texas.

In the case of Gilmer *v.* Day, an action by a landlord to recover the value of a storehouse destroyed by fire, the evidence was held by the district court of Edwards County, Texas, which heard the case, to show that the fire was due to the defendant's negligence in using a defective stove and consequently a judgment was awarded the plaintiff. Day, the tenant, appealed and the case was heard before the Court of Civil Appeals of Texas at San Antonio. The following opinion handed down by Chief Justice Fly of this court in affirming the judgment of the lower court recites the circumstances of the case and gives their legal significance.

> Appellee (Gilmer) sued appellant (Day) to recover $11,000, the value of a storehouse, alleged to have been destroyed by fire, through the negligence of appellant. The cause was submitted to a jury on special issues, and on the responses thereto judgment was rendered in favor of appellee for the sum of $10,000.
>
> The evidence in the case was circumstantial, and the only question presented is the sufficiency of the testimony to support the verdict. The jury found that appellant did not knowingly set fire to the house, from which we may infer that the intention was to find that appellant did not intentionally ignite the building. The jury found that the fire was the proximate result of the carelessness and negligence of appellant in connection with the use of a defective stove; that he negligently permitted paper, trash, and other combustible material to accumulate and remain on the floor close to the stove; that appellant negligently permitted fire to escape from the stove and ignite the floor and inner walls of the building. The uncontradicted facts showed that appellant had kept a very defective and dangerous stove in appellee's storehouse, of which he was the lessee; that on more than one occasion appellee had remonstrated with him on the condition of the stove, and as to his carelessness in permitting paper and other combustible matter to accumulate about the stove, and warned him of the danger. Appellee had suggested a way in which to eliminate the danger, and appellant had promised to remedy the situation. Coals had at times been seen to escape from the stove and fall to the floor, and this had occurred only a short time before the fire broke out a few minutes after 10 o'clock on the

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The data for the San Antonio case is furnished by Member S. W. Inglish, Manager, Texas Inspection Bureau. Judge Fly's opinion is copied from the *Southwestern Reporter*. The story of the Cincinnati case is furnished by Member Ralph E. Richman of Cincinnati, Editor of *Fire Protection*.

night of October 30, 1923. At or near 10 o'clock appellant left the store, and not later than 15 minutes afterwards the fire broke out in close proximity to where the stove was situated. The door to the ash box of the stove was broken off, and the ash pan was gone, and ashes and coals would fall into the unprotected ash box, and would roll out the aperture for the door to the floor. The stove was in a dangerous condition. Appellant promised to have the stove repaired, which appellee agreed to pay for. The stove was not repaired. At 8 o'clock on the night of the fire a witness swore he saw coals of fire roll out of the stove. Appellant admitted that the stove was in a defective condition. At 9:30 o'clock, not more than 35 or 40 minutes before the fire was discovered, there was a very hot fire in the stove, and the floor close to the stove was littered with paper and paper box lids and excelsior that is found in candy boxes, close to the wooden box (filled with dirt) in which the stove was placed. The evidence showed that the fire broke out in the immediate vicinity of the stove, and the fire was seen by numerous witnesses to be near the base of the beaver board partition near the stove, and where witnesses had seen coals of fire at different times roll out of the stove. Even appellant was convinced, and admitted that the fire probably started from the stove, and that negligence caused it.

The circumstances lead to the inevitable conclusion that the fire originated from a defective stove negligently used by appellant. There is no other conclusion that can be reasonably reached as to the origin of the fire. Not one circumstance tended to show spontaneous combustion. There was no evidence whatever upon which to base such a theory, the only evidence being that of appellant: "I suppose there were combustibles in there that would cause spontaneous combustion." In civil cases the same rule as to circumstantial evidence does not obtain as in criminal cases. In criminal cases the circumstances must be of such a cogent nature as to lead to no other reasonable hypothesis than the guilt of the defendant, but in civil cases the plaintiff is not bound to prove his case so clearly as to exclude the possibility of any other theory, nor to establish beyond a reasonable doubt the facts relied upon for a recovery. Elliot Ev. 2502. In this case the evidence shows beyond a doubt gross negligence upon the part of the appellant in the manner in which he kept and operated the stove, and this negligence was noted up to a few minutes of the time the fire occurred. The negligence was proved and admitted by appellant, and there is no other reasonable hypothesis upon which to base the origin of the fire than the defective condition of the stove and the negligence in permitting combustibles to be strewn about it.

Appellant had locked the store, when he left a few minutes before the fire began, on the inside. There is no testimony tending to show that the store was open when the fire began, or that any one had been in the store after appellant left it. The fire originated on the inside. The theory that an incendiary might have set fire to the building has no foundation whatever. It has no more basis in the evidence than the untenable theory of spontaneous combustion. The only reasonable conclusion to reach is that the fire began from a defective, hot stove, and that appellant was knowingly negligent in using such a stove.

The facts in this case meet every requirement in order to show negligence by circumstantial evidence, as laid down by this court in Railway *v.*

Greenwood, 40 Tex. Civ. App. 252, 89 S. W. 810. There was no evidence upon which to base a verdict of negligence in the Greenwood Case; the circumstances are strong and cogent in this case. We adhere to the rule as expressed in that case:

"It is doubtless true that negligence, as any other fact, may be proved by circumstantial evidence, but in such cases the circumstances must be such as to reasonably lead up to and establish the fact sought to be proved."

We adhere to the rule that, in order to prove negligence by circumstances, "there must be something more than a probability of defendant's negligence. There must be some element of moral certainty and exclusion of reasonable doubt." The facts in this case create at least some element of moral certainty, and exclude a reasonable doubt as to the fire having originated from a defective stove through the negligence of appellant.

There is nothing to indicate anything conducive to or which might have produced spontaneous combustion. It would be mere speculation to base any theory of the fire on spontaneous combustion, and, as to incendiarism, the only person who could possibly set fire to the building from the inside was appellant, and the jury has concluded that he did not set the house on fire intentionally. There is nothing in the record to indicate spontaneous combustion or incendiarism, and there is no other hypothesis upon which to base the origin of the fire except that it came from the defective stove.

The justment will be affirmed.

Judge Fly's further comments on a motion for rehearing:

It is stated that there was no warrant for the statement that coals fell from the stove. There was an ash box under the stove, but no ash pan, and it had a broken door, and just a short while before the fire the broken door was noticed and appellee insisted that appellant should have it repaired. He saw it was dangerous. Appellee noticed coals rolling down from the stove to the ash box that had no door to it. He warned appellant against the danger. He saw that there was nothing to prevent the coals from escaping and setting fire to trash on the floor about the stove. The box of dirt about the stove would have protected the floor if there had been any door on the ash box to prevent coals from rolling out. Ed Adams (a witness) swore that he saw the stove and he thought it dangerous, and thought coals could roll out of it.

Will Ake (a witness) swore: "The condition of the stove at that time was pretty bad. I mean by that, that the door was off the front, and it looked pretty dangerous to me. There was paper and box lids scattered over the floor, and it appeared very dangerous to me; that a coal or spark could fall there and they would catch."

This was a short time before the fire began. The fire, when first seen, was near the stove. The partition near it was on fire.

It was shown that appellant was in the store 10 or 15 minutes before the fire broke out. The jury found that he did not set fire to the store, and it must have come, as he stated, from the defective stove. He said to Wood Sherrill that the fire "was probably started from the stove, that he kept some inflammables in the room with the stove, and that some of them had been spilled on the floor. I think he mentioned alcohol and turpentine." Fire must have rolled from the stove to ignite the inflammable substances. Appellant admitted that he had been warned of the unsafe condition and

asked to repair it, but although he had promised so to do, he failed to repair it.

Day (the appellant) told Mrs. Brown after the fire that "he felt like negligence was the cause of the fire: . . . that he was very sorry about the fire." He attributed the fire to the stove, which he admitted he should have repaired. He knew that the house had been destroyed through his carelessness and gross negligence, and admitted it, and expressed sorrow for the results of his negligence. There is no escape from the fact of negligence of appellant causing the fire.

Cincinnati, Ohio.

A jury in a Cincinnati court allowed the City of Cincinnati $500 damages in a suit brought against a citizen who had failed to obey a fire prevention order of the fire department. The $500 was the amount of expense incurred by the City of Cincinnati in extinguishing the fire. Suit was brought under the Cincinnati Personal Responsibility Ordinance, an ordinance which gives the city the right to seek, in a civil suit, the amount of expense incurred by the city in extinguishing or attempting to extinguish a fire which starts or spreads by reason of the failure of a citizen to obey any written order of the chief of the fire department.

This was the first case of its kind ever tried in Cincinnati and is believed to be the first case of its kind ever taken before a jury.

On May 6, 1924, an inspector of the fire department issued a written order to Jacob Brand, reading as follows:

Provide metal-lined box for excelsior.
Provide metal-lined box for paints.
Provide two 2½-gallon fire extinguishers.
Clear aisles in basement and second floor.

On June 24, 1924, a second order of the department was issued, covering the same premises, reading, "Remove all rubbish from basement and second floor."

These orders were repeated verbally by inspecting firemen from time to time, but nothing had been done toward carrying out these orders when a fire occurred on the premises March 8, 1925. Firemen who fought the fire testified that windows were blocked, that passageways were difficult to find and get through and that rubbish was present in quantity in the basement and also on the second floor.

The first step of the Cincinnati department was to bring Mr. Brand into the municipal court for failure to obey the orders of the department. In this court he was fined $600.

After this trial, the city sent Mr. Brand a bill for $650, computed as follows:

8 companies, 1 hour each, $75 per hour.....	$600.00
2 marshals, 1 hour each at $25 per hour.....	50.00
	$650.00

The charges are the same as are made against outside cities when Cincinnati's apparatus responds to calls for outside help. Before the case went to the jury, the judge ruled that the salaries of the firemen would have to be deducted in computing expenses assessed against a citizen of the city, since, according to the judge, these salaries would have gone on and been paid regardless of whether or not the fire had occurred. The jury, in making its decision, deducted $150 on account of salaries and allowed the city the full amount of its claim with the exception of that which had been ruled out by the judge.

The issue in the case was fixed by the city. The city set out to prove that the fire started by reason of rubbish which had accumulated at the bottom of the stairs leading from the first floor to the basement. The city was not called upon to prove the exact cause of the fire but only to prove that the fire had started because the excelsior and floor sweepings at the bottom of the stairway had not been cleaned out as called for in the order and had not been placed in a metal-lined box. In the testimony, however, the city set up spontaneous ignition as the cause of the fire and this was not disputed by the defendant.

The defense attorney stated that the confusion on the premises where the fire occurred was caused by the firemen themselves upsetting boxes, overturning stock and generally tearing up the place. He criticized the fire department for failure to arrest Brand long before his fire occurred.

Nine witnesses were called to the stand to prove the city's case. Among these were Edward Steinway, chief of the Fire Prevention Bureau; J. J. Conway (Member N.F.P.A.), superintendent of the Cincinnati Salvage Corps, and Chris Wolfers, captain of the Salvage Corps. Inspectors told of serving the orders and of having the defendant refuse to listen to them when they courteously requested action upon the orders. Other firemen who were present at the fire, including Chief Steinway and Superintendent Conway, told how the fire had spread and made it clear to the jury that the fire originated at the bottom of the stairway in the rubbish which had accumulated there. Chief Steinway introduced into the evidence "Field Practice," the inspection manual of the National Fire Protection Association, to show that it recognized "spontaneous ignition" as a fire cause. The judge did not permit the sections referring to spontaneous ignition to be read to the jury.

In his instructions to the jury, Judge E. M. Hurley said that the jury had this question to answer, "Would the fire on the premises of Jacob Brand have started and caused a run of the fire department if Mr. Brand had obeyed the order of the Fire Prevention Bureau?" The jury answered this question in the negative and then had only to decide how much the

damages were. The verdict of the jury, six men and six women, was unanimous and was reached in twenty minutes.

Early in the trial, the defendant attacked the constitutionality of the ordinance under which he was being sued. This ordinance reads as follows:

> "In the event of fire resulting directly or indirectly from any omission or neglect to properly comply with any written order of the chief of the fire department as provided in Sections 1026-3, 1026-4, 1026-5, and 1026-6, any such owner, lessee, occupant or person culpable or negligent in respect thereto shall be liable to the City of Cincinnati for the payment of all costs and expenses of the fire department incurred in and about the use of employes, apparatus and materials in the extinguishment of any fire resulting from such cause; the amount of such costs and expenses to be fixed by the director of public safety and to be collected by him in a civil action wherein the City of Cincinnati shall be plaintiff and the party culpable or negligent, as above set forth, shall be defendant."

Judge Hurley, in ruling that the ordinance was in accord with the Constitution, gave the following memorandum opinion:

> "The city has introduced evidence showing the cost of the oil and gasoline used in the fire apparatus, the water used, and expert testimony as to the wear and tear on the various pieces of fire apparatus used during the progress of the fire.
>
> "At the end of plaintiff's testimony the defendant offered a motion to dismiss on the ground that the section above referred to is unconstitutional in that the city has no power to pass such an ordinance, and that the same is unreasonable.
>
> "1. There is no question in law but that a municipal corporation has a right to sue or be sued in its own name.
>
> "2. A municipal corporation has a right to maintain and operate a fire department.
>
> "3. A city council has a right to pass all reasonable legislation for the safety and protection of the community.
>
> "It is even competent for a state in the exercise of its police power and in the interest of public safety to put an absolute liability upon a person without any corresponding fault on his part, so statutes have been passed and held constitutional which make railroads absolutely liable for fires caused by their locomotives, R. R. Co. v. Matthews, 165 U. S. page 1, and for the safety of a community a state may regulate the use of property to prevent the risk of fire, Patterson v. Kentucky, 97 U. S. 501.
>
> "The Court is of the opinion that this case is in the same category or analagous to a situation as follows:
>
> "If a person were driving an automobile through the streets of a municipality at a speed beyond the regulations provided for in a municipal ordinance, and in so doing while in the act of violating the ordinance regulating such speed, the automobile would wreck a fire apparatus, whether such apparatus was responding to a fire or returning to its engine house, there would be no doubt but that the municipality would have the right to maintain an action against the owner of the said automobile for damages result-

ing from the negligence of the owner of this automobile. In addition thereto, the failure to perform the duty prescribed by such ordinance is evidence of negligence, which when an injury results, gives a cause of action, as is well set out in Annie Shields, Admx. for Michael Shields, deceased, v. Pugh Co., 122 N. Y. Appellate Div. Reports, 586, where the rule is laid down as follows:

> " 'It is a general rule that the violation of a duty imposed by statute or ordinance is evidence of negligence which may justify a verdict against one who has violated the same.'

"It seems to this Court therefore that a municipality would have the right to pass an ordinance, which has been done in the instant case, providing for the fixing of civil liability and making it negligence to fail to comply with the ordinance requiring the inspection and proper provisions to be made for the entrance of the fire department into any building in case of fire, or requiring the owner thereof to equip said building with fire fighting appliances.

"It does not seem to this Court that there is anything unreasonable about an ordinance or section thereof, where it appears on its face it is passed for the protection of the community at large and is not discriminatory in its nature. There is no doubt that damage does exist for the use of fire apparatus in the wear and tear thereof in responding to and fighting a fire. The city is put to the expense of paying for oil, gasoline, water, hose, etc., all elements of damage which the Court believes the city should collect when called upon unnecessarily to use, when the same could have been avoided if the ordinance above referred to had been complied with.

"The Court is further of the opinion that this case is decided in every detail by the case of Adamson, Fire Commissioner of New York City, v. Greenwood Cemetery, 164 N. Y. Reports, Appellate Division, Supreme Court, page 832.

"The Court believes the section of this ordinance to be constitutional and that the city has the right to maintain such action and fix such requirements as are so stated in this section of the ordinance."

Fire Prevention in Japan.

The N.F.P.A. Executive Office had an interesting visitor recently in the person of Mr. Takeo Matsumoto, a Japanese, who was spending some time in the United States studying fire prevention and insurance. He told of fire prevention work in his country and said that a need was being felt in Japan for standards similar to those of the N.F.P.A.

He secured a complete set of N.F.P.A. standards and made application for membership on behalf of his company, the Teikoku Fire Insurance Company of Tokyo. He left several fire prevention posters such as are used in Japan. Two of the smaller ones are reproduced below. He left another quite similar to our own Fire Prevention Week poster which was in colors difficult to reproduce in black and white. He mentioned that the annual fire loss in Japan was estimated at about 150,000,000 Yen, or $300,000,000. Since Japan has a population of 56,000,000, its per capita fire burden is somewhat larger even than that of the United States and Canada.

Typical Japanese fire prevention posters. This type of poster, reproduced about half original size, is distributed by insurance companies to policy holders, who are supposed to post them in doorways of their homes and other conspicuous places. The main legend is an admonition to be careful with fire, and the less conspicuous lettering gives the name of the insurance company.

Standpipe System Pressure Regulation By Means of Restriction Orifices.*

By A. W. Claussen (Member N.F.P.A.).
Assistant Engineer, Underwriters' Laboratories.

The continually increasing height of buildings in large cities, with correspondingly larger variations in pressure on standpipe outlets, due to difference in elevation between the upper and lower floors, has made it necessary to devise some simple and yet reliable means for regulating the pressures on hose streams so as to minimize the danger which may result from the use of extremely high pressures.

In fire protection equipment in mines it is also desirable, and in some cases necessary, to provide some means for automatically regulating the pressure so that the hose will not become unmanageable at the bottom of the shaft.

Two methods of regulation present themselves as being readily available and are probably best adapted to the service. One method consists of the use of pressure regulating or reducing valves at each hose station. The other method consists of the insertion of restriction orifices in the hose valve or coupling.

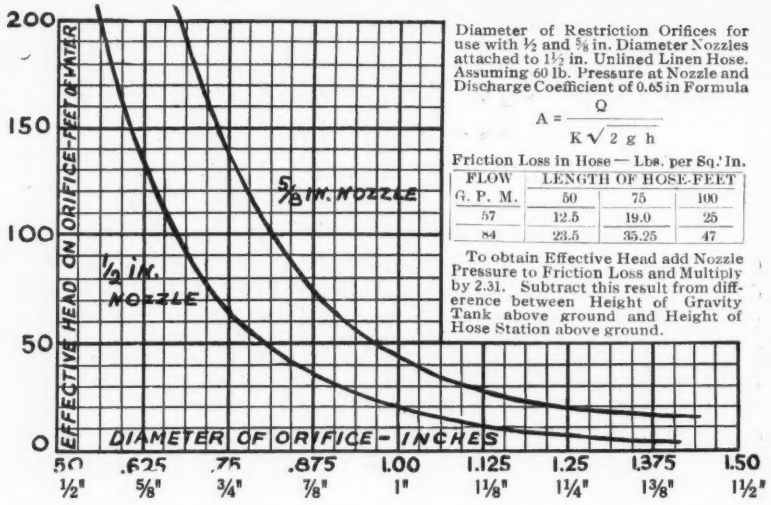
The first method appears to be objectionable on the score of high first cost and the necessity for frequent testing to insure that the devices are in good working order. The second method is inexpensive, and the device once installed needs no further attention.

It is the purpose of this article to show what sizes of restriction orifices are suitable for the two sizes of nozzles which are probably used most extensively for first aid fire service.

The accompanying graph shows two curves, one for a ½ inch smooth bore nozzle attached to 1½ inch unlined linen hose, and the other for a ⅝ inch smooth bore nozzle, also attached to 1½ inch hose. In these curves the effective head in feet of water on the orifice is plotted against the diameter in inches, and by knowing the elevation of the gravity tank or pressure in the pressure tank, the elevation of the hose station, and the pressure desired on the nozzle, the size of the orifice can be determined. The two curves were obtained by assuming a pressure of 60 pounds per square inch at the nozzle which in the case of the ½ inch nozzle will give a discharge of 57 gallons† per minute, and for the ⅝ inch a discharge of

*From *Laboratories' Data.*

†Obtained from fire stream tables.


200
150
100
50
0
EFFECTIVE HEAD ON ORIFICE-FEET OF WATER
5/8 IN. NOZZLE
1/2 IN. NOZZLE
DIAMETER OF ORIFICE - INCHES
.50 .625 .75 .875 1.00 1.125 1.25 1.375 1.50
1/2" 5/8" 3/4" 7/8" 1" 1 1/8" 1 1/4" 1 3/8" 1 1/2"

Diameter of Restriction Orifices for use with ½ and ⅝ in. Diameter Nozzles attached to 1½ in. Unlined Linen Hose. Assuming 60 lb. Pressure at Nozzle and Discharge Coefficient of 0.65 in Formula

$$A = \frac{Q}{K\sqrt{2\,g\,h}}$$

Friction Loss in Hose — Lbs. per Sq. In.

FLOW	LENGTH OF HOSE-FEET		
G. P. M.	50	75	100
57	12.5	19.0	25
84	23.5	35.25	47

To obtain Effective Head add Nozzle Pressure to Friction Loss and Multiply by 2.31. Subtract this result from difference between Height of Gravity Tank above ground and Height of Hose Station above ground.

Small divisions represent 1/32 inch C = .03125" of diameter of orifice.

84 gallons per minute. Where the conditions call for other nozzle pressures it will be necessary to plot other curves, but the two shown here probably represent average requirements: 60 pounds per square inch at the nozzle. This pressure delivers a good stream without making it difficult for persons untrained in the use of fire streams to handle the hose and manipulate the nozzle.

The use of the curves can probably be illustrated to best advantage by following through an example. Assume a gravity tank 375 feet above the ground, with a hose station 75 feet above the ground. This gives a net head of 300 feet at the hose station. Assuming that we wish to have a pressure of 60 pounds per square inch on a ½ inch nozzle, this will give a discharge of 57 gallons per minute, and if the nozzle is attached to 100 feet of 1½ inch unlined linen hose the friction loss in the hose will be about 25 pounds per square inch. This means that we must have a pressure of 85 pounds per square inch available at the entrance of the 100 foot length of hose. To convert pressure in pounds per square inch to head of water in feet, multiply 85 by 2.31, which gives 196.35 feet. We find that we have 300 feet available, due to the elevation of the gravity tank and the hose station. The effective head on the orifice is the difference between the pressure on the inlet and outlet side, or 300 – 196.35 or 103.65 feet.

Since it might be desirable in some situations to compute the diameter of the orifice and to make the formula shown by graph clear, the problem will be worked out for a ½ inch nozzle.

$$A = \frac{Q}{K \sqrt{2 g h}}$$

where

A=area in square feet.

Q=quantity of water in cubic feet per minute.

K=constant for orifice, assumed to be 0.65.

g =acceleration due to gravity=32.2 feet per second per second.

h =effective head on orifice in feet of water.

Let the effective head be assumed to be 100 feet, and the flow from the nozzle 57 gallons per minute as in the previous example.

To reduce the quantity in gallons per minute to cubic feet per second multiply 57 by $\frac{1}{60 \times 7.5}$ since there are 7.5 gallons in a cubic foot of water.

Substituting the proper values in the formula we have

$$A = \frac{\frac{57}{60 \times 7.5}}{(0.65 \sqrt{2 \times 32.2 \times 100})} = 0.00243 \text{ square feet.}$$

To reduce this term to square inches multiply 144 by the decimal 0.00243, then A = 0.35 square inches. A circle which has an area of 0.35 square inches has a diameter of 0.668 inch.

Referring to the graph, the curve for the ½ inch nozzle shows that for an effective head of 103.65 feet, an orifice 0.665 inch in diameter should be employed to give the required nozzle pressure of 60 pounds per square inch.

In plotting the curves in the graph, a discharge coefficient of 0.65 was used in all computations. It is of course known that the value of the discharge coefficient is dependent upon a number of variables, among which are design of orifice, diameter, and head; but from tests which were conducted it was found that for a drilled orifice in a ¼ inch brass plate, the value of the coefficient varied from 0.61 for a 31/32 inch diameter orifice, to 0.676 for a ¾ inch orifice, and 0.65 was taken as representing a fair average value and close enough for the application of the formula under these conditions.

The values for friction loss over 1½ inch unlined linen hose are average values obtained from friction loss tests and probably represent the average friction loss for a good quality of hose. Some hose has been found to have a friction loss approximately twenty-five per cent less than the values shown on the graph, and this would, of course, have a slight effect on the pressure obtained at the nozzle if hose of this grade was used with the restriction discs.

Laclede Gas Co. Building Explosion.

Report by St. Louis Fire Prevention Bureau.

(Member N. F. P. A.)

A gas explosion and ensuing fire in the Laclede Gas Light Company building in St. Louis on October 8, 1925, caused the death of four persons, injuries to 57, and damage estimated at $71,000, of which $57,000 is attributed to the explosion and $14,000 to the ensuing fire. Occurring in a modern type office building of fire-resistive construction, the circumstances of this disaster are of particular interest. The escape of gas responsible for the explosion is laid to inadequate supporting of a six inch gas main in the basement, and the extent of the damage to the spread of the explosion through an inadequately protected pipe shaft.

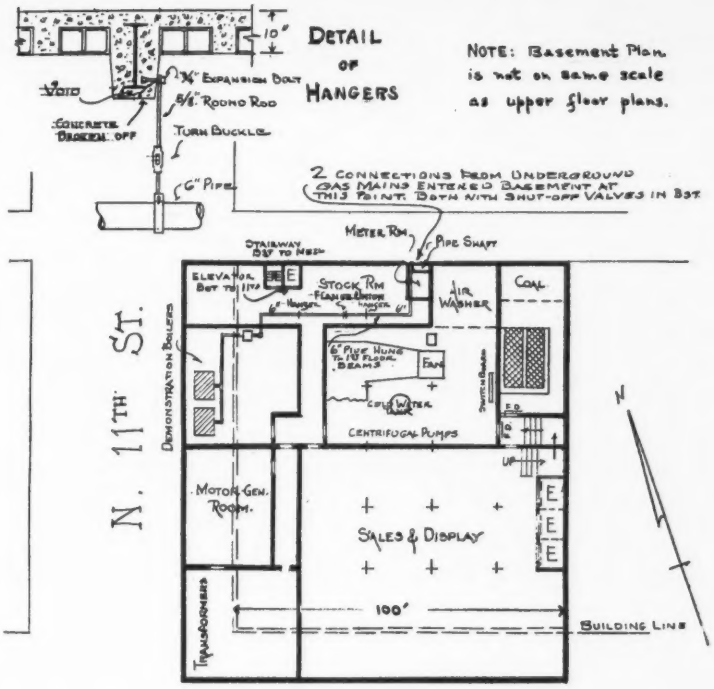
Construction of the Building.

The building, erected in 1913, is 100x109 feet in area, and eleven stories, 140 feet, in height. Construction details are summarized as follows:

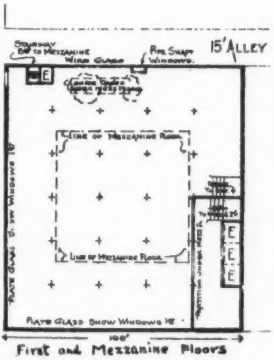
Fire-resistive protected steel skeleton construction; 12 inch brick curtain walls. Flat reinforced concrete rib and tile constructed floors and roof 10 inches in thickness. Spaces between columns 15x15 feet. One passenger and one freight elevator shaft through all floors enclosed in hollow tile, openings covered with steel doors having wired glass panels. One open stairway from basement to mezzanine floor and one open stairway through all floors. One inside fire escape or smokeproof tower enclosed in concrete and hollow tile from eleventh to second floor, access from outside iron balconies on each floor. Three shafts enclosed in hollow tile through all floors, carrying steam pipes, wiring cables and gas pipes. Suspended metal and lath and plaster ceiling in basement; plaster direct on concrete on other floors. Corridors and first floor finished in Italian marble. Partition walls of hollow tile and gypsum blocks. Boiler room in basement enclosed in 12 inch brick walls with fire door on opening.

Occupancy.

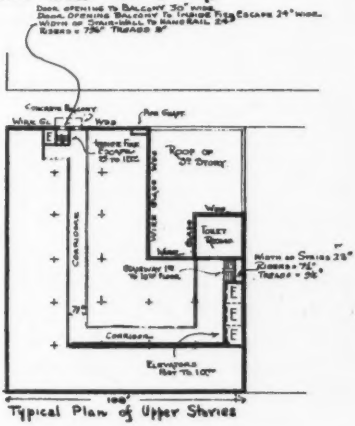
The fifth and seventh floors are occupied by various tenants as offices. The rest of the building is occupied as service and department headquarters and general offices by the Laclede Gas Light Co., a public service corporation operating gas plants and furnishing gas supply for the City of St. Louis. Basement contains boiler room with two high pressure boilers; transformer room, motor-generator room, fan room, air washer, air compressor and pumps operated by 500 volt motors. Small ammonia cooled water tank. Small stock room. Gas meter room, 6x12 feet, enclosed in



Basement Plan Laclede Gas Co. Bldg.



First and Mezzanine Floors



Typical Plan of Upper Stories

3 inch tile with one 6 inch high pressure and one 6 inch low pressure gas mains entering from the outside through the alley on the north. One room contains two large gas heated boilers for demonstrating purposes. One large room is used for demonstration of gas ranges and gas heated devices in which a cooking class was being conducted at the time of the explosion. First and mezzanine floors were occupied for service and accounting offices and display of gas heated appliances. Eleventh floor used for storage of stationery and for storage and repairing of light fixtures. Other floors used as offices.

The Explosion.

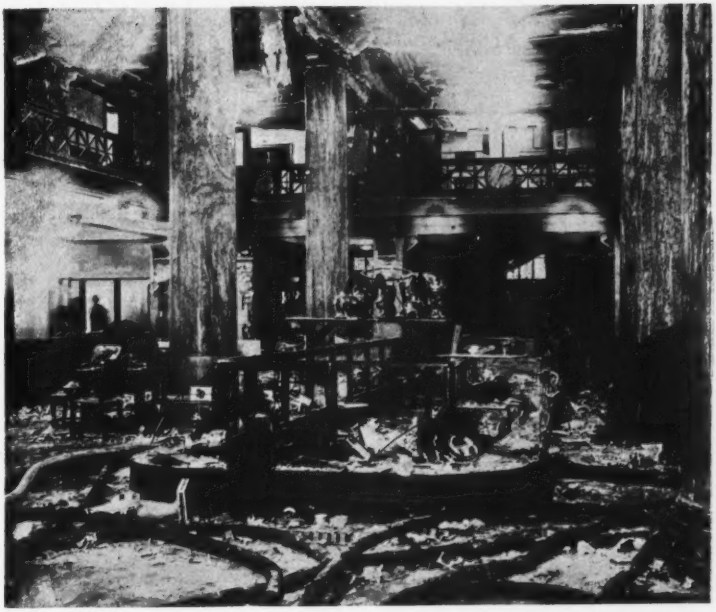
An explosion of illuminating gas occurred a few minutes after 2:00 P. M. in the north side of the basement in the stock room and adjoining meter room, where the two six-inch gas pipes enter the basement and from where the gas pipes branch to various parts of the building. The explosion wrecked partition walls and the suspended metal lath and plaster ceiling in this part of basement, broke piping and heating and ventilating ducts, broke through part of first floor between columns, damaging marble finish, plaster cornice around ceiling beams, office and display fixtures and blowing out all plate glass show windows on this floor, also breaking plate glass windows in buildings across the street. The force of the explosion followed heating and ventilating ducts through the various floors, blowing some of the ventilators out of the ducts. Great force was exerted through the gas pipe shaft extending directly from the meter room in the basement through all floors and terminating under the roof in the stationery store room on the eleventh floor. This shaft is 18x48 inches, enclosed in 3 inch hollow tile with openings into rooms on each floor covered with swinging fire doors. Some of the doors were blown off, the shaft partly wrecked and the windows and exterior curtain walls of some of the rooms through which the shaft extends were blown out.

The Fire.

Alarm from public street box was received at Central Fire Alarm Office at 2:04 P. M., followed by a second, third and fourth alarms, transmitted by officers of the Fire Department respectively at 2:07, 2:11 and 2:54, bringing 21 engine companies, six hook and ladder companies, and 176 officers and men. The Salvage Corps also responded with three companies and 36 men.

The fire which followed the explosion was confined to the small stock room in the basement and the stationery storage room on the eleventh floor. The exploding gases in the pipe shaft leading directly from the meter room in the basement to the stationery storage room on the eleventh floor ignited and practically destroyed the contents of this room, which consisted mostly of stationery on wood shelving.

The fire in the basement consisted of burning gas from a broken six-



P. & A. Photo.

First floor of the Laclede Gas Light Co. Building, St. Louis, after the gas explosion and fire. Four persons were killed and fifty-seven injured in this disaster.

inch gas main which had extended from the meter room through the stock room to the two demonstrating boilers in the west end of the basement, a distance of 65 feet. This pipe had fallen from the ceiling in the stock room from which it was suspended and in falling broke the flanged union joining together two long lengths which parted when the flange broke permitting large volume of gas to escape which ignited and continued to burn until the gas supply was shut off in the street.

This stock room in which the gas was burning is also used as passage to the meter room adjoining and contained some gas appliances on small wood shelving against the wall. The shelving was burnt. There was no other combustible material and no other fire damage.

The fire on the eleventh floor was fought with hose streams from the fire escape balconies and from roofs of this and the fourteen-story building across the alley. Hose streams were also played on the burning gas at the broken main in the basement until the gas was shut off. The shut-off valves on the gas mains where the pipes enter inside the basement could not be reached and the members of the Fire Department estimate that it was about one-half to three-quarters of an hour before the Gas Company

employees located and shut off the gas supply valves in the street.

Four persons were killed in the explosion and 57 injured, who were taken to hospitals and dispensaries, besides a number treated for asphyxiation. Of those killed, one was a woman cashier working in a cashier's cage on the first floor, the floor under the cage being shattered by the explosion. The other three were the engineer and two maintenance men whose bodies were found in the basement near the broken 6 inch gas pipe. Those injured were largely those in the basement and first story at the time of the explosion. A number of persons were treated for gas asphyxiation. Some sustained minor injuries in making their exit from the building.

Exit Facilities and Their Use.

It is estimated that there were some six hundred people in the building at the time of the explosion. The time between the explosion and complete evacuation of the building is not known; it probably was about eight to ten minutes. The fire department, upon arrival, directed and assisted the people from the building, using ladders and aerial trucks to the windows and fire escape balconies. The main stairway and smokeproof tower were used by the people on the upper floors and the passenger elevators were also kept running until the people were all out.

Panic ensued, particularly among the women employees. Statements were made by members of the fire department that some of the girls had to be persuaded to venture down the stairway, and that there was congestion at the landings which had to be opened by police and firemen. Many of those coming down from upper floors collected on the mezzanine floor and were taken down by fire department ladders. The main stairway was only 28 inches wide and was open from the basement to the eleventh story. The inside fire escape or smokeproof tower stairway was only 24 inches wide and extended only to the second floor. There was no swinging stairway from the lowest balcony to the street or other means of escape from this point except through the building or down fire department ladders.

The Cause.

According to testimony at the coroner's inquest and newspaper interviews, heavy leakage of gas was noted and reported by employees on various floors in the vicinity of the pipe shaft several minutes before the explosion occurred, and the engineer and his assistants who were killed had gone to investigate when the explosion occurred.

Careful investigation was made by inspectors from the St. Louis Fire Prevention Bureau the following morning before any debris had been removed, and it is their opinion that the hangers supporting the long six-inch gas main passing through the stock room gave way, causing the pipe to sag and fall, breaking the flanged union joining two 18 foot lengths and permitting a large volume of gas to escape.

This pipe, installed last winter, extends from the meter room through the stock room to the gas fired demonstration boilers in the west end of the basement, a distance of about 65 feet with two right angle turns and weighing approximately 1200 lbs. It was suspended under the metal lath and plaster ceiling, while other piping originally installed was placed under the floor above the suspended ceiling.

Besides the supports at each end, the investigation disclosed only two hanger supports for this pipe. These hangers consisted of ⅝ inch rods with turnbuckles, the lower end of the rods being attached to a clamp around the pipe. The upper ends were not clamped to the lower flange of the floor I-beams above as it should be for secure support, but were fastened by ¾x3½ inch expansion bolts to the concrete protection around the beams, the bolts being inserted in the concrete on the side of the beams about 3 inches above the lower edge.

On one of the hangers this edge of the concrete was broken off releasing the bolt and hanger. The upper end of the rod and the turnbuckle of the other hanger was still attached to the floor beam and the lower end of the rod attached to the clamp on the fallen pipe. Though parted, the threads on the rod were not stripped and from appearances this supporting hanger never had been joined in the turnbuckle and consequently had afforded no support.

The cause of the ignition of the escaping gas cannot be determined. There was fire under the steam boilers, but they are located in a separate room some distance from where the explosion occurred. The gas fired demonstration boilers were not being operated at the time. A spark may, however, have been produced by a number of causes, such as the broken pipe striking the floor, dropping of men's tools or other friction, lights, etc. There were also motors in operation in the basement, though not in the same room. No evidence was found to substantiate reports to the effect that the explosion was caused by steam pipes or ammonia.

Conclusions.

Long runs of large gas mains within buildings should be placed underground and not be suspended from ceilings by doubtful supports.

The installation of approved emergency gas shut-off valves conveniently located outside buildings, should be required for all buildings using large supplies of gas.

Pipe shafts extending and forming a flue through high buildings should be blocked at each floor level. If the pipe shaft in this building had been so blocked, it is probable that the effects of the explosion and fire would have mainly been confined to the basement and first story.

Exit stairways should be enclosed and should provide direct access to outside the building at the street level.

Gas Plants – Fire Record.

In making up this record 158 reports of fires in the files of the N.F.P.A. Department of Fire Record have been used. These include records available on fires in or about illuminating gas manufacturing properties. A fire record of gas plants was published in the QUARTERLY in 1913 (Vol. 6, No. 4, page 476), which record included some 53 fires. In the same number of the QUARTERLY (page 445) is a very complete article on the hazards of manufacturing illuminating gas.

The fires have been analyzed and classified as to common and special hazard causes where the cause has been known. The fires of special hazard origin are nearly twice as numerous as those due to common causes, while about one quarter of the fires are of unknown origin. Of the fires of unknown causes 20 were explosions of which the cause could not be determined. It may be assumed, however, that most of these explosions were caused by the ignition of gas and air mixtures.

Spontaneous ignition was by far the most frequent of the common causes of fire. In the large piles of soft coal, which is used extensively in these plants, and in the piles of spent oxide sponge, which is waste material from the purifiers, are many opportunities for spontaneous ignition. Not a few spontaneous ignition fires were also caused by the oily waste accumulations common to most industrial plants. Next in importance among the common hazard causes were hot cinders and coals, and smoking.

Among the hazards which may be properly designated as special, over half of the fires were caused by escaping gas being ignited in one or another manner. Such ignition could be traced in the largest number of cases to some definite open flame. The fire in the generator was a common source for such ignition. In about one-third of the fires caused by the ignition of escaping gas the source of ignition could not be determined. The next most frequent special hazard is the ignition of oil, generally too b ysome open flame. Hot coke accounts for several more fires, while miscellaneous special hazards caused the rest of the fires in this group.

Most of the fires occurred in the working rooms of the plants, the generator room being the one most frequently visited. Other locations where many fires started are purifier rooms, engine and blower rooms, coal and coke sheds, retort houses, and storage rooms. In about one-third of the fires the loss was large, but many of the fires were comparatively insignificant.

Sprinkler experience covered in this record is not conclusive, there being but six fires where there were any sprinklers involved.

The following are tables giving detailed analysis of these fires. Appended to this record are the stories of several typical fires.

CAUSES OF FIRES.

	No. Fires		% Known Causes
Common Causes	45		38.6
Special Hazard Causes	72		60.4
Total Known Causes		117	100.0
Explosions, Cause not Known	20		
Unknown Causes	21		
Total Unknown Causes		41	
Total Fires		158	

Common Causes.

	No. Fires		% Known Causes
Spontaneous ignition (oily waste, soft coal, etc.)	14		12.0
Hot Cinders and Coals	7		6.0
Smoking	6		5.1
Chimney Fires	3		2.6
Lightning	3		2.6
Electricity	3		2.6
Exposure	2		1.7
Incendiary	2		1.7
Miscellaneous Common Causes	5		4.3
Total Common Causes		45	

Special Hazard Causes.

Escaping Gas Ignited	38		32.4
By Open Flame (gas jets, stove fires, etc.) 13			
Unknown flame or spark 12			
Generator 6			
Locomotive Sparks 2			
Sparks from tools 2			
Matches 2			
Incandescent Electric Light 1			
38			
Ignition of Oil by open flames, etc.	10		8.5
Hot Coke	5		4.3
Generator	3		2.6
Ignition of tar, various causes	3		2.6
Ignition of Benzol	3		2.6
Bunsen Burner	2		1.7
Miscellaneous Special Hazards	8		6.7
Total Special Hazard Causes		72	
Total Known Causes		117	100.0

Room in Which Fire Occurred.

	No. Fires	% With Data
Generator Room	19	13.8
Purifier Room	14	10.1
Engine and Blower Room	14	10.1
Coal and Coke Sheds	12	8.8
Retort House	12	8.8
Storage Room	11	8.0
Gas Holders and Tanks	9	6.5
Yard	8	5.8
Roof	5	3.6
Meter Room	5	3.6
Basement	3	2.2
Boiler Room	3	2.2
Benzol Recovery	3	2.2
Coal Conveyor	3	2.2
Laboratory	2	1.4
Extractor Room	2	1.4
Tar Still	2	1.4
Workshops	2	1.4
Miscellaneous	9	6.5
Total with Data	138	100.0
No Data	20	
	158	

How Discovered.

	No. Fires	% With Data
Employee	103	74.0
Explosion	10	7.2
Watchman	13	9.4
Outsider	13	9.4
Total with Data	139	100.0
No Data	19	
	158	

Time of Day.

	No. Fires	% With Data
6 A. M. to 6 P. M.	80	56.3
6 P. M. to 6 A. M.	62	43.7
Total with Data	142	100.0
No Data	16	
	158	

Analysis of Loss.

	No. Fires	% With Data
Small Loss (less than $5000)	96	69.5
Large Loss (over $5000)	42	30.5
Total with Data	138	100.0
No Data	20	
	158	

EFFECT OF SPRINKLERS.

	No. Fires
Extinguished Fire	2
Held Fire in Check	2
Did not Open	2
Total Where Sprinklers Were Factor	6
No Sprinklers	152
	158

Typical Fires in Gas Plants.

H-21529. GAS HOLDER. Oil floating on the lower water seal above a large gas holder became ignited in some manner. Two men were at work on the frame work of the gas holder at the time the fire started, and it is believed that one of them may have dropped a cigarette into this seal. The burning of this oil generated heat enough to cause the gas in the holder to expand to its limit, after which the gas proceeded to bubble through the water seal and add fuel to the fire. Collapse of the structure was prevented by keeping the steel work cool by means of hose streams.

H-20669. Spent oxide sponge from purifiers, stored on a dump, took fire. The probable cause was spontaneous ignition. A lively fire was extinguished by the fire department.

H-19311. PURIFIER HOUSE. The water seal blew out from a purifier box, thus allowing gas to discharge into the building. This gas ignited from some cause not known and caused a violent explosion which completely wrecked the purifier building and a great deal of other property in the immediate neighborhood. Three people were killed and many people were badly injured. Total damage was about $200,000.

H-16495. BLOWER AND EXHAUSTER HOUSE. The fire started in a pump or engine room, an employee noticing flames under the floor. The fire is believed to have started either at a wooden support of a stream trap from the hot steam pipe, or from hot coals from the generator. The fire passed into the exhauster (engine) room through two small pipe holes in the brick wall, thence to the floor of the exhauster house where a fuel oil pump caught fire and added fuel to it. The tar and oil soaked floor of the exhauster house and the machines in it ignited and completed the spread of fire through that building. It was extinguished by the fire department.

H-8458. PURIFIER HOUSE. Fire was caused by spontaneous ignition in iron filings. An employee who discovered the fire extinguished it with a hose from a standpipe. The lower cover plate had been removed from the purifier box, and when the top cover was removed, air going through the filings and sawdust from the purifier, caused them to ignite spontaneously.

H-2641. An outsider lighting a match in one of the main buildings caused the ignition of escaping gas which resulted in an explosion.

H-369. A workman took an unguarded lantern into this basement for a light while repairing a leak in a gas main. Fire which resulted was put out with a private line of hose.

H-18866. GAS HOLDER. This gas holder, which was nearly 40 years old, contained some 4,000,000 cu. ft. of gas. Its steel plates had become very badly rusted and very little was left but a heavy coat of paint in some places. Probably a leak in one of the top plates suddenly grew larger by the failure of some of these plates, this liberating the gas and allowing the tank to fall rapidly. Steel splinters were actually shaved off from many of the parts and heat enough was very likely generated to ignite the cloud of escaping gas above. Eye witnesses report that there was no loud or violent explosion, but rather an immense ball of fire which hung suspended in the air for 10 to 20 seconds, followed by a tremendous heat wave in all directions which started numerous small fires.

H-8786. COAL SHED. The fire was evidently caused by spontaneous ignition of the coal in a wooden coal shed. The shed becoming ignited from the coal made a substantial fire that was finally extinguished by the fire department after ineffectual efforts to extinguish it had been made by employees.

H-8098. METER ROOM. Fire started in this room in a clothes locker, and was probably due to a lighted pipe left in a pair of overalls in one of the lockers. The watchman discovered the fire on his regular rounds and after emptying two extinguishers extinguished the fire.

A Nitro-Cellulose Process Fire.

Report by Underwriters' Bureau of New England.
(Member N. F. P. A.)

The ignition of flammable vapors in a building occupied by a tenant of a rubber manufacturing company in a New England city recently, caused the loss of the lives of three men, and large loss on the building and contents. The occupancy involved heavy hazards, the processes being the impregnation of cotton felt with nitro-cellulose solution, the felt to be used in manufacturing shoe counters and box toes.

The building is one story, with 8 inch brick walls, a plank roof on a heavy timber frame and a wooden floor with a small shut off space beneath it. The accompanying diagram shows dimensions and layout. The easterly section was used as a churn room, the middle section for storage of nitro-cellulose solution in 160 gallon wooden casks, and the westerly section for impregnating and drying. The wing on the north side was used for storage of rolls of felt.

Processes.

Nitro-cellulose film scrap was dissolved by churning in electrically operated churns. The solvent used was 40% ethyl acetate, 40% benzol, and 20% denatured alcohol. About 100 gallons of this solvent were used for each charge of a churn. The dissolved nitro-cellulose was then pumped to storage casks or direct to the impregnating tank. This tank was wooden, about 5 by 5 feet and 1 foot deep. A roll of felt, 36 inches wide, was set up in front of this tank. The end of the roll passed between wooden rollers into the tank, where it passed through the dissolved nitro-cellulose, thence out of the tank at the other end between wooden rollers again which compressed the felt, forcing out the excess liquid. The end of the felt was then clamped to a conveyor adjoining the dipping tank. This conveyor consisted of a metal frame about 5 feet wide and 9 feet long, set about 3 feet from the floor, with an endless grid, made of wooden laterals fastened to a chain at each side, passing over it. The conveyor was driven by a chain from shafting above, which in turn was driven by a belt from a small motor. This motor was set in a recess in the wall about 2 feet from and slightly above the level of the conveyor. The impregnated felt was pulled out by this conveyor and was fastened again by a clamp 6 feet from the end and was cut off by hand. This 3 by 6 foot sheet of impregnated felt was then clamped to a wooden slat and carried to a dryer where it was hung and dried.

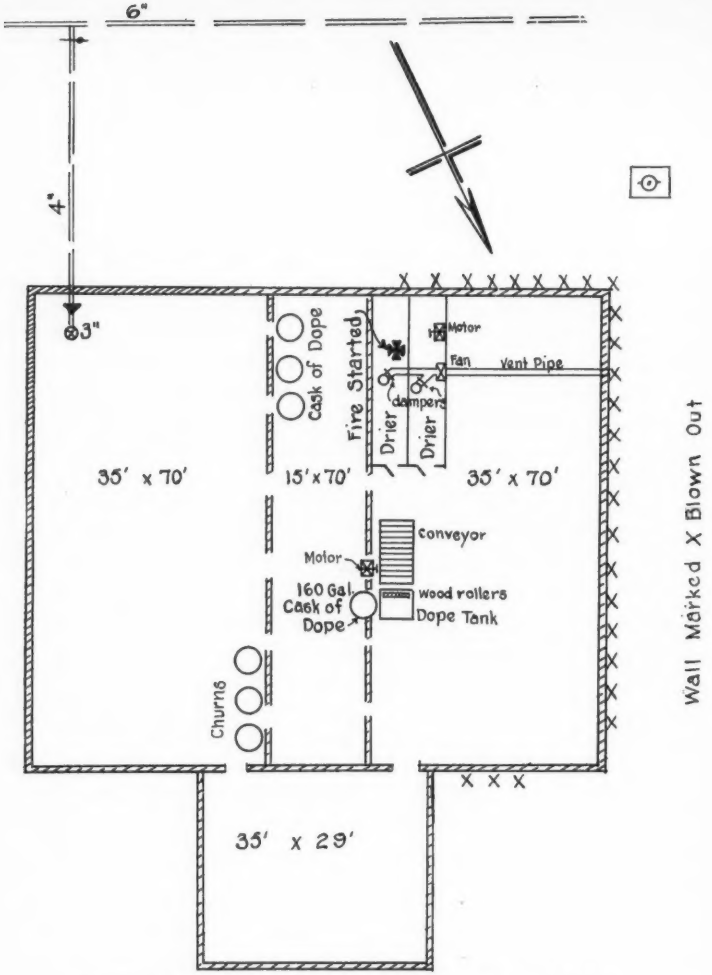


Diagram showing layout of nitro-cellulose process plant.

The dryer was located in the southeast corner of the impregnating room about 8 feet from the conveyor. It was a light board on wooden frame structure 24½ feet long by 11½ feet wide by 8 feet high, divided lengthwise by a board partition into two equal sections. The sections were heated by steam coils under a wooden slatted floor and were vented through an opening in the top connected to an exhaust fan which dis-

charged the vapors outside. There were air inlets at the bottom at each end of each drier. One vent pipe was used in common by the two dryers, a branch connecting with each section. Dampers were provided so that fumes could be drawn from either dryer. The fan was bronze and was driven by a belt connected to a small motor located above the dryers and about 5 feet from the fan.

Story of the Fire.

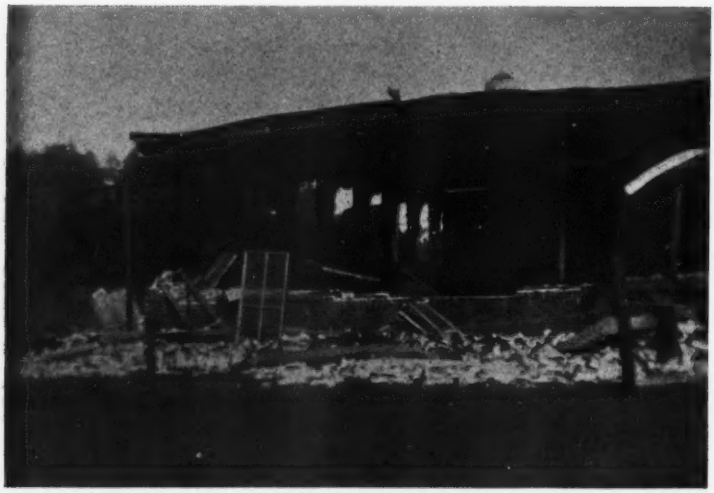
The fire occurred at about 9:30 A. M. At this time the easterly dryer had been filled and is said to have been closed up for about 45 minutes. It contained about 90 sheets of impregnated felt. The fan was operating, but the damper to this section was closed. The inlets at the bottom were also closed. The westerly dryer was being filled and is said to have had 20 or 30 sheets put into it. The fire is said to have started in the easterly dryer. The door of this section was blown off. This was followed by a flash throughout the impregnating room. The westerly wall of the building and most of the north and south walls of the westerly section blew out. The two men who were at work filling the westerly dryer have since died.

The building was equipped with a good sprinkler system, except that there were no sprinklers inside of the frame dryers, and 49 of them operated. The fire was mostly confined to the dryers and their contents, the impregnating tanks, stock on the conveyor and a slight charring of a part of the roof.

The fire alarm was given by employees through public alarm box and telephone. In addition to sprinklers, which held the fire in check, the fire department used five hose streams to extinguish the fire.

The impregnating room had no artificial ventilation. Fumes here had been previously noted to be dangerously dense. Electric lights were not protected by vapor-proof globes. There were no lights inside of the dryers, however. Motors in the room were not cut off from fumes.

The fire, which was seen in the dryer from outside the building, before the explosion occurred, probably originated from one of two causes: (1) The felt was impregnated with dissolved nitro-cellulose or pyroxylin plastic scrap and other ingredients, the chemical stability of the resulting material being open to question. Even pyroxylin plastics of comparatively stable character will decompose under the influence of heat from steam coils. The temperature in the dryer is not known but it was surely a dangerous one for these materials under the best of circumstances. In view of the known fire record of the product of this plant it is felt that there is a strong probability that the nitro-cellulose compound was comparatively unstable. In brief, the fire may well have been due to the spontaneous heating and ignition of the impregnated felt under the in-



Exterior view showing condition of the building. The roof of this building was supported on wooden columns independent of the brick walls.

fluence of heat. (2) The dry room was improperly arranged. Steam coils were at the floor under a grid, and about them dirt and droppings necessarily accumulated. Fires arise in ordinary lumber dry kilns from just such arrangements. In this case the material was far more sensitive to heat, and the fire might readily have originated at the floor rather than in the material being dried.

Assuming decomposition of the nitro-cellulose to have started, or fire to have started, the next step would be the rapid evolution of great quantities of gas. This gas, in itself combustible, would build up sufficient pressure to force a rupture of any ordinary enclosure. In this case it probably burst open the door of the dry room, projecting flame and gas into the main areas. The atmosphere in the main areas being charged with flammable vapors, a flash and explosion occurred which forced out the walls of the building.

Conclusions.

Means for the prevention of such losses lie in the isolation of hazards, the provision of proper vents and ventilation, the prohibition of obviously dangerous arrangements of manufacturing operations, the provision of adequate ventilation and gas vents, the elimination of causes for ignition of vapors, and the provision of complete sprinkler protection of special design and sensitive control.

Sprinkler protection was restored within a few hours after the fire. Manufacture will not be resumed at this plant, it is said.

Plastic Floor Coverings.

Because of their several desirable features, patented plastic floor coverings are being quite commonly used. Appended to this article are records of several fires which are due to the serious hazard surrounding the process of laying them. The fires recorded due to these materials have all been serious. In each case they have spread so rapidly as to have been practically "flash" fires. In each case workmen's lives have been in danger; in most, the men have escaped by a small margin; in one fire, four workmen lost their lives.

The two most recent of the fires were reported by H. M. Bray, Manager of the Columbia, S. C., office of the Southern Adjustment Bureau. The name of the particular flooring compound involved in these fires is "Duraflex." Mr. Bray also refers to compounds which are similar in nature to "Duraflex," named as follows: Insulite, Resilite, T. M. B., Beigler, Hochmeister-Lind, Kompolite, and Tendalite. "Mastic" composition is another compound of this class which figured in one of the fires summarized in this article.

This type of flooring is used as a wearing surface over concrete floors. When it hardens and sets it gives a finish similar to linoleum, and a firm and resilient floor.

The material comes in steel drums. It resembles asphalt which forms its base, and with which is combined asbestos fibre, silica sand and mineral pigment. Naphtha is used as a solvent to work the compound into a plastic state, and when a drum of the compound is opened, about one-quarter of the drum is pure naphtha, which must be stirred into the compound, in about the same way that paint is mixed in a can. Any further thinning necessary is done on the job with ordinary gasoline.

In laying the flooring it is spread with a trowel in several thin coats which dry rapidly. About eight coats in all are required and make a covering about ¼ inch thick. The top coat is often smoothed and leveled off to a finish with a buffing machine.

Since the very process of laying this type of flooring depends on its quick-drying qualities due to the volatility of the solvents used, the surrounding air is sure to become heavily charged with the explosive vapor which may be ignited by the most casual spark. Compounds of this sort have been reported in use since 1908, and a representative of the Duraflex Company informed Mr. Bray, referred to above, that they had experienced few fires. However, they recognize the hazard to the extent of

furnishing with each consignment enough "No Smoking" signs to placard the building where the material is to be used. The fire reports herewith indicate that it is impracticable to effectively safeguard this product while it is being put down as fires occur even when ventilation is provided by opening doors and windows, "No Smoking" signs are posted, and the workmen are warned particularly. Fires that occur from the explosive vapors of the compound are serious, and involve unusual hazard to life and property.

The logical solution of the problem probably could be found in developing a non-flammable solvent to take the place of the naphtha and gasoline used at present. Such a solvent, however, would probably cost more than the cheaper and dangerous ones.

Typical Fires.

OCTOBER 1, 1925. ROCK HILL, S. C. A fire occurred in the new building of the Citizens' Trust Company of this city, in its main banking room. About two and one-half hours before the fire a new floor of a patent material, "Duraflex," had been completed, which floor covered all except the central part of the banking room which is paved with marble. Each workman in the building denies lighting any match, but such an action seems the only reasonable cause of the fire. Either this action ignited the vapor of the flammable solvent or the discarded match ignited the solvent-saturated flooring itself. The fire spread rapidly over the entire banking room developing such intense heat that the room was almost entirely wrecked, and three men working on the mezzanine floor in the front part of the bank were caught and burned before they could get out of a window. One of these, the superintendent in charge of the work on the building, had all his clothes burned off and was taken to the hospital in a critical condition. The flooring furnished the principal fuel for the flames, though wooden window sash and frames of doors were badly burned.

SEPTEMBER 10, 1925. GREENVILLE, S. C. A fire occurred in the building under construction for the Chamber of Commerce. A workman was laying "Duraflex" flooring in one of the rooms on the fourth floor of the building. At the same time another workman was chipping down a concrete door jamb in the same room, using a cold chisel and hammer. Suddenly a flame developed very near to the workman at the door, some five or six feet from where the man was at work on the floor. It is supposed that either one of the men lit a match to smoke or a spark was struck from the workman's chisel, which caused the ignition of the flammable vapor present. The flame spread immediately over the entire floor surface, came very near burning one of the workmen, and caused nearly $1000 damage to two rooms and a hallway.

H-21154. SEPTEMBER 18, 1924. MONTGOMERY, ALA. A two-story brick building was being erected. On the first floor, "Resilite," a plastic floor covering, was being laid over a concrete floor. This compound contained considerable naphtha as a thinner, and was further thinned with

gasoline on the job. The superintendent had ordered everybody on the premises to stop smoking when he learned that the flooring was flammable.

The process of laying the compound consisted in first painting the concrete with a thin solution which formed a binder or sizing which probably is not flammable. Then two black coats of the compound are put on with a trowel followed by two similar coats of red compound. Then the top coat is floated on with gasoline so that it will set smooth.

The workmen had been at work about an hour and two strips of the flooring had been put down. According to his helper, the man laying the compound lit his pipe which caused the fire to flash over the whole floor. The local fire department put out the fire after about an hour, during which damage amounting to about $8,000 occurred.

H-19725. JULY 12, 1923. CHATTANOOGA, TENN. (This fire was included in the Office Building Fire Record in the QUARTERLY for October, 1923, Vol. 17, No. 2, page 194.) A new fire-resistive office building was under construction. In the course of his work it became necessary for an electrician to cut a conduit pipe in the ceiling of the first floor, by use of an acetylene torch. On the second floor, directly above, a fresh layer of "Mastic" composition, a plastic floor covering, had just been applied. A spark from the torch ignited this material. This plastic flooring is a composition of asbestos and eleolite. In order to conveniently apply it, it is mixed with gasoline as a softener. The gasoline solvent evaporates after the flooring is laid, leaving a pulpy floor similar in appearance to linoleum. Eleolite is a by-product of peat which is imported from France. Once laid, the flooring is not flammable to any extent, except before the gasoline has evaporated.

The fire flashed over three rooms on the second floor almost instantly, consuming the flooring, burning out several window and door frames, and breaking all the windows. Fatalities were avoided by the lucky circumstance that the rooms were empty when the flash occurred. Damage in all amounted to about $2,500.

H-18773. AUGUST 8, 1922. BOSTON, MASS. (This fire was included under the heading of Interesting Fires in the October, 1922, QUARTERLY, Vol. 16, No. 2, page 212.) Painters were at work in the basement of a new fire-resistive office building. "Duraflex," a patented plastic floor covering, was being laid. This floor material was mixed with gasoline to a consistency that allowed easy spreading on the floor. The careless act of some workman in lighting a match ignited the gasoline fumes from this plastic floor compound, the resulting blaze spreading immediately to newly varnished partitions, creating a hot fire that lasted about 20 minutes. The burning of these materials created a noxious gas which suffocated four workmen who were trapped in a vault.

The Utah Oil Refining Co. fire at its height. The high pressure stills enveloped in flames and the adjacent tube stills being cooled with hose streams. Four men were burned to death in this fire.

Utah Oil Refining Co. Fire.

Report by A. J. Snow.
Board of Fire Underwriters of the Pacific (Member N.F.P.A.)

A fire at the Utah Oil Refining Co., Salt Lake City, September 5, 1925, caused the death of four men and property damage estimated at between $50,000 and $75,000. The fire originated in a high pressure gasoline process still when a tube burst. The stills and adjacent construction were of steel and reinforced concrete. The only combustible material was oil from the stills.

Discovery of the Fire.

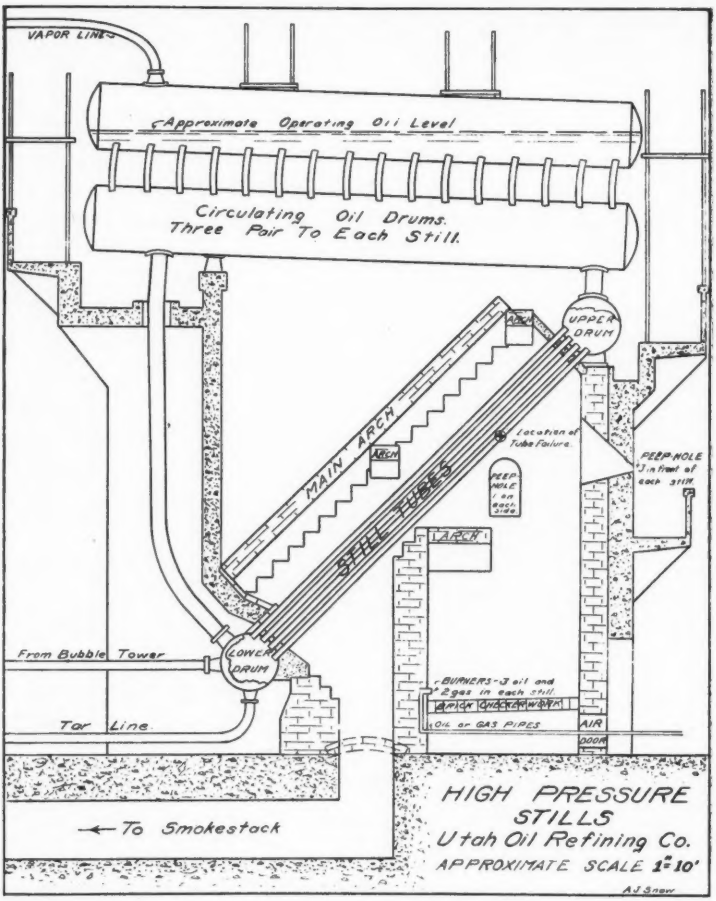
At about 2:40 P. M. on September 5, the still man at the high pressure still noticed that something was wrong with still No. 21 and notified the assistant superintendent, Mr. Arnold, that his still was smoking. Although at this time there was no fire, Mr. Arnold had the private fire brigade chief's call number blown from the plant whistle and then in company with a foreman he immediately went to the source of the trouble. Upon arriving near the stills he stopped at the receiving house to make sure that the pressure in the stills was being reduced and that the oil was being drawn from them. Both of these things were being done. Mr. Arnold then proceeded to the stills, but just before he reached them the burning oil flames burst out of the air doors in the fireboxes and enveloped the stills in fire. When this happened there were five men in front of the stills—the foreman who had accompanied Mr. Arnold, and four still operators. Of these, one escaped with minor burns, two were so badly burned that they died within a few hours at the hospital where they were taken, and the foreman and the other operator were burned to death before they could escape.

Employees of the plant immediately upon seeing the fire pulled a city fire alarm box and the local fire alarm was sounded.

Cause of the Fire.

The immediate cause of the fire was the burning of a tube in still No. 21 with the consequent flooding of the fire box beneath the still with hot oil, which was then forced out of the air door in front. The cause of the tube failure is a matter of conjecture.

The high pressure stills operate normally at a temperature of approximately 860° F. with a pressure of 325 pounds gage. Normal operation was being carried on previous to the fire. Each of the stills usually contained about 13,000 gallons of oil during a run. Their total capacity is



13,500 gallons each. Fresh oil is continually pumped in through the charging line so a constant oil level may be maintained. A sketch of the construction of the high pressure stills appears above.

The tubes in the stills were ordered under the following specifications: steel boiler tubes, seamless construction, 4 inch outside diameter, walls 4 gage A.S.M.E. standard, cold finished. The tube which failed was in the lower tier of tubes in still No. 21. The fracture occurred about seven feet from the junction of the tube with the upper drum. When the failure occurred, buckling of the tube caused one end to pull out of the

drum and also an adjoining tube was forced out allowing the oil to flow from two 4 inch openings in both the upper and lower drums. All tubes are tested at a pressure of about 660 pounds before they are placed in the stills. The tube which burst had been in the still since about August 19, 1924. Inspections of the tubes are made continuously while the stills are in operation. Peep holes are arranged so that tubes may be inspected on all sides. The operating force had changed shifts only about thirty minutes before the trouble was first noticed by the still man at which time the stills had been inspected by the foremen of the two shifts.

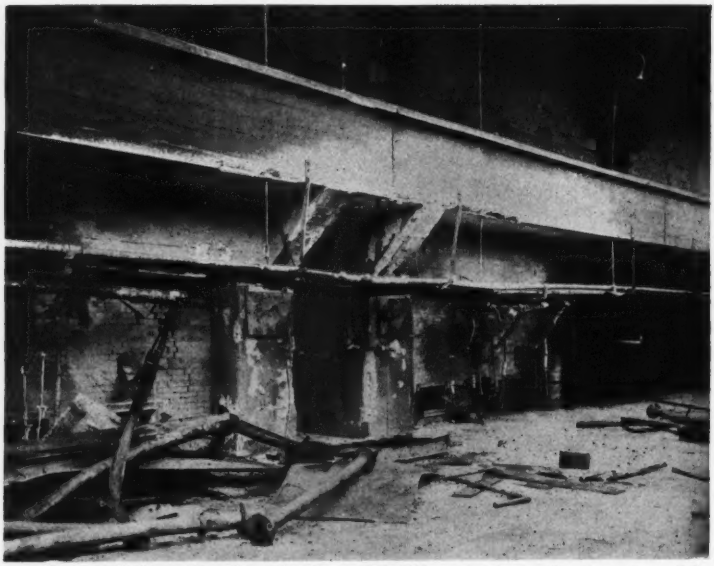
A picture of the section of the tube where failure occurred is reproduced on this page. The opening in the tube meaures about 8.8 inches wide and 7.6 inches long with short splits at the ends of the opening, which increase the length of apparent failure to about 8.8 inches. The steel at the sides of the opening is necked down to a thin edge. There is a short split along the tube on each side of the break which looks very much like a welding seam. The surface of the splits look very much like welding scarfs although the tubes were supposed to be seamless. A few inches on each side of the burst the tube section has a diameter of about 4.2 inches although it was originally only 4 inches.

Burst section of still tube. Note bend at point of failure and splits at the ends of the opening indicating that the tube may have failed along a weld.

There are two tentative theories as to the cause of the failures. They are:

1. That the burst tube was one of welded seam construction which was accidentally included in the shipment of seamless tubes and that the failure occurred when the tube opened along a defective weld.
2. That a small leak occurred in an adjacent tube which permitted oil to spray out and this acting as a blowtorch upon the tube caused a section to be heated to a point where the still pressure was sufficient to cause the tube to blow out.

The plant officials seem certain that the failure was not due to a formation of coke in the tube with a resulting hot spot. They claim that the constant inspection would almost certainly allow a hot spot formed in this manner to be discovered before any damage could result. Their experience has been very satisfactory in regard to formation of coke in the tubes of high pressure stills.



Front of the stills after the fire. Still No. 21 where the fire started is at the left. Four men standing here when the still tube gave way lost their lives. Note spalled concrete and damaged brick work.

Story of the Fire.

The city fire department received the alarm from the plant at 2:50 P. M. and immediately responded with all pieces of apparatus (the ladder truck responded but returned to the station and the crew remained there in case of emergency) and the local fire brigade responded with hose and chemicals. Nothing could be done in extinguishing the fire which enveloped the stills and emerged from the concrete stack near. A wind from the south directed the flames from still No. 21, which was the source of the fire, to the stills Nos. 22 and 23 on the north. A string of tank cars containing gasoline was located on the tracks just to the east of the burning stills and this was safely removed from the fire zone. The principal work of the fire department was in spraying surrounding construction with water and keeping it cool. Since there was no combustible material in the still construction itself the fire burned itself out when the oil supply from the stills was exhausted. Just previous to the fire the stills were being drained through the tar discharge line. The oil was being by-passed around the pump and the pressure in the stills was depended upon to force the oil out. The valves into the tar line header from all the stills were open. When the tube in still No. 21 burst and reduced the pressure, the oil from stills Nos. 22 and 23 flowed into still No. 21 and added fuel to the

flames. Each of the stills normally contains about 13,000 gallons of oil, or a total for the battery of three of about 39,000 gallons. Of this amount about 29,500 gallons was unaccounted for after the fire and was presumed to have been burned. The remainder was recovered through the tar line. If the valve from still No. 21 into the tar line header had been closed immediately after the bursting of the tube, the result would have been the saving of the remaining oil in the stills, Nos. 22 and 23—something over 20,000 gallons. The closing of this valve was not thought of during the excitement of the fire and it was a matter of conjecture by the plant officials for some time as to just how the oil in stills Nos. 22 and 23 had been burned. At first it was thought that these stills must have failed also, but examination after the fire revealed no defects in their tubes or drums.

Property Loss.

The fire resulted in a property loss of between $50,000 and $75,000. This was distributed over the following items: oils in stills, concrete construction around stills, ironwork around stills, insulation over stills, outlet of concrete smokestack.

Due to the fact that a southerly wind was blowing, still No. 22 was damaged somewhat more than still No. 21 where the fire originated. Concrete construction around the stills was badly spalled and unprotected ironwork was generally sagged out of shape from its own weight.

Conclusions.

No known method of inspection or testing would probably have predicted a tube failure such as the one in this case with the resulting fire. Inspection methods used were standard and apparently no carelessness was involved. Property loss, however, could probably have been reduced if the valve from still No. 21 into the tar line header had been closed in time. There was sufficient time after still No. 21 started smoking so that all operators could have gone to a place of safety, but the warning was unheeded since an accident such as occurred was not expected and up to this time was unheard of.

Fires in Which There Was Loss of Life.

These notes are intended to point out typical conditions under which loss of life has occurred that they may be known and guarded against.

Children and Matches.

H-22514. NEW BEDFORD, MASS., OCTOBER 8, 1925. A four-year-old girl set fire to her bed while playing with matches. Her mother, hearing the child screaming, rushed into the bedroom and found the bed a mass of flames. She wrapped the child in a blanket and ran into the street with her where a neighbor helped extinguish the flames. The child was taken to the hospital, where she died in a short time.

H-22611. DORCHESTER, MASS., NOVEMBER 5, 1925. Two children, one a year and a half old and the other three and a half years old, were left alone in the house. The older child found some matches and in playing with them set fire to the bed on which they were playing. This bed was against a window, and people passing the house quickly saw the fire and the children, but were too excited to make any move to rescue them until a policeman rushed into the house and started a search for them. The younger child was found under a bed in another room, burned to death. The older boy was found under another bed, badly burned.

H-22780. NEW ORLEANS, LA., DECEMBER 12, 1925. Two children were playing with matches in a shed containing oil and paper. When the fire started the older child ran out of the building and slammed the door. A woman opened the door and tried to find the little girl, but was driven out by the smoke and flames, her hair badly burned. By the time the firemen arrived the little girl was burned beyond recognition.

Gas Jet.

H-22681. BEVERLY, MASS., NOVEMBER 6, 1925. An aged woman was trying to light the gas jet in her room when her nightdress caught fire. People who lived in another part of the house heard her screams and succeeded in extinguishing the fire by use of rugs. She was seriously burned about the arms and body, however, and died the next day in a hospital.

NOTE: The majority of the fires reported here occurred in territory near the Executive Office, these being fires upon which data was obtainable by the N.F.P.A. Department of Fire Record. Though these fires took place mostly in Massachusetts they may be considered typical of those occurring daily throughout the United States and Canada. It is requested that members encountering instances of loss of life by fire send particulars to the Executive Office, so that it will be possible to make this section of the QUARTERLY more representative of the fires occurring throughout the country.—ED.

Kerosene.

H-22516. WORCESTER, MASS., OCTOBER 8, 1925. A three-year-old child was burned to death and her mother was terribly burned, when the kerosene which she was using to quicken a fire in the kitchen range flared up and enveloped both in flames. A baby in a carriage near the stove escaped injury. Other tenants of the apartment house, when they heard the screams, rushed to their aid, but the clothing was nearly burned from their bodies before the fire was extinguished.

H-22678. PEABODY, MASS., NOVEMBER 1, 1925. One man was burned to death and another seriously burned when fire destroyed the little shack in which they lived. It was thought that a mistake was made in pouring kerosene instead of water into a kettle which was placed on the stove. When the oil came in contact with the heat of the stove the fire followed. Their well had run dry and there were cans of water as well as kerosene near the stove. A neighbor hearing the cries of "Fire" rushed to the shack and succeeded in tearing the burning clothes from the elder man, but not before he was fatally burned.

H-22771. SHANNOCK, R. I., DECEMBER 2, 1925. A three-year-old boy was burned to death and his older sister seriously injured in a fire which destroyed their home. During the absence of the mother, the boy poured a can of kerosene over the kitchen floor. This was ignited by heat from the stove and in a short time the entire house was in flames. The sister, when she found her escape cut off, jumped from a window on the second floor, and sustained injuries to her back.

H-22784. PORTLAND, MAINE, DECEMBER 29, 1925. A seventeen-year-old girl placed a can full of kerosene on the kitchen stove, preparatory to pouring the kerosene on wood in the stove to start the fire. A few seconds after she rested the can on the stove cover it exploded with a violence that shook the building. The girl became a living torch. Hardly a spot on her body escaped being terribly burned. She was taken to the hospital and died a short time later. The mother was slightly burned.

Gasoline Storage Tanks.

H-22445. MT. VERNON, OHIO, SEPTEMBER 14, 1925. The plant consisted of a one-story frame building, the front part of which was used as an office and a filling station, while two tank trucks were kept in the rear section. There were also a number of gasoline and oil tanks located nearby. One of the employees was filling the second or middle compartment of a three compartment tank truck, when there was a flash and the whole back of the truck and loading rack was in flames. Burning gasoline from the small tank in the shed ran down the slope and with the heat from the blazing building and gasoline in the truck tanks made the large tanks

of gasoline boil. The vapors soon ignited. The loss of life came when the firemen, warned by the owner of the company not to do so, turned water on red hot gasoline tanks, which burst and showered blazing gasoline into the air and over the firemen. They dashed into a river which flows near the plant and two of them lost their lives. A boy, who had volunteered to assist the firemen, became entangled in the weeds along the river and died before he could reach the water.

Gasoline.

H-22574. QUINCY, MASS., OCTOBER 11, 1925. A sixteen-year-old boy was using a watering pot to fill the gasoline tank of an automobile, which had run out of gasoline. He was pouring the liquid into the tank when some of it fell on the hot exhaust pipe and ignited. His clothes caught fire and he was terribly burned. He died three days later in the hospital.

Overheated Stoves.

H-22782. HOLDEN, MASS., DECEMBER 18, 1925. Five children and their mother lost their lives in a fire which destroyed their home. The mother, who was asleep on the second floor with the children, grabbed the baby and started to run down the stairs, but she was forced back by dense smoke and flames. She then ran to the window and was in the act of jumping when her husband, who had been able to make his escape, called to her to wait. He placed a ladder against the house and succeeded in rescuing his wife and the baby. He then brought two other children down the ladder, but he was unable to reach the other four. Their bodies were found in the ruins, and from their position it is believed that the oldest girl had tried to lead her brothers down the stairs, but all were enveloped in flames and perished. The mother and baby were taken to the hospital, where the baby died that night and the mother the next day. The fire was caused from an overheated stove in the kitchen.

H-22783. TAUNTON, MASS., DECEMBER 27, 1925. A nine-year-old girl gave her life in an attempt to rescue her three-year-old brother. The four children and their grandmother were asleep on the second floor of their cottage, when the older girl was awakened by smoke from a fire, which started from an overheated stove. The child and her grandmother started down the stairs and while the grandmother was groping about in the dense smoke, the girl rushed back up the stairs for the little ones. Two of the children were rescued and then it was discovered that a third was missing. A fireman rushed up the stairs and found the little body on a bed. He picked it up and then came across the body of another child huddled near the bedside. It was that of the little girl, who had tried to save her brother's life.